WESTERN INDUSTRY

• *What are ink and paint without color? Here is the color mill room of a Western ink factory. For details see page 5.*

SEPTEMBER 1950 VOLUME XV NUMBER 9

- **Materials Handling flow solves production problem in plant that outgrew itself. p. 35**
- **Grease can wreck machines as well as keep them rolling. Find how to use it. p. 38**
- **How you gonna keep your men in the plant when Uncle wants 'em too? Current info. p. 44**
- **If you treat steel properly, machining it will be much easier. For the plant man. p. 52**

There's more to a Wirebound box than wood, wire and price!

Experience, adequate plant facilities and container know-how are essential to soundly engineered, dependable containers. Cabco has been making wooden containers since 1883. Facilities embrace everything from logging to the finished wirebound. Cabco is the West's recognized leader in designing, developing and supplying wooden shipping containers.

New Cabco Wirebound cuts shipping weight 55 lbs. for California furnace manufacturer

Kresky Mfg. Co., Inc. now ships its large wall-type Oil Burner Furnace in a Cabco wirebound crate weighing but 55 pounds. Formerly, shipments were made in a nailed crate that required 60 board feet of lumber, weighed 110 pounds empty. Besides important savings in freight, Kresky finds their new Cabco wirebounds cut container purchase costs 50%, save appreciably on assembly and packing time and economize on warehouse space. *Perhaps now is the time to let Cabco engineers examine your shipping container problems.*

Special open-type Cabco wirebound crate folds quickly around Kresky Oil Furnace in 6 minutes, guards against damage, permits easy identification of equipment.

3134

CABCO CONTAINERS

A product of the California Barrel Company, Ltd.

Sold only through

DUFF CALIFORNIA CO.

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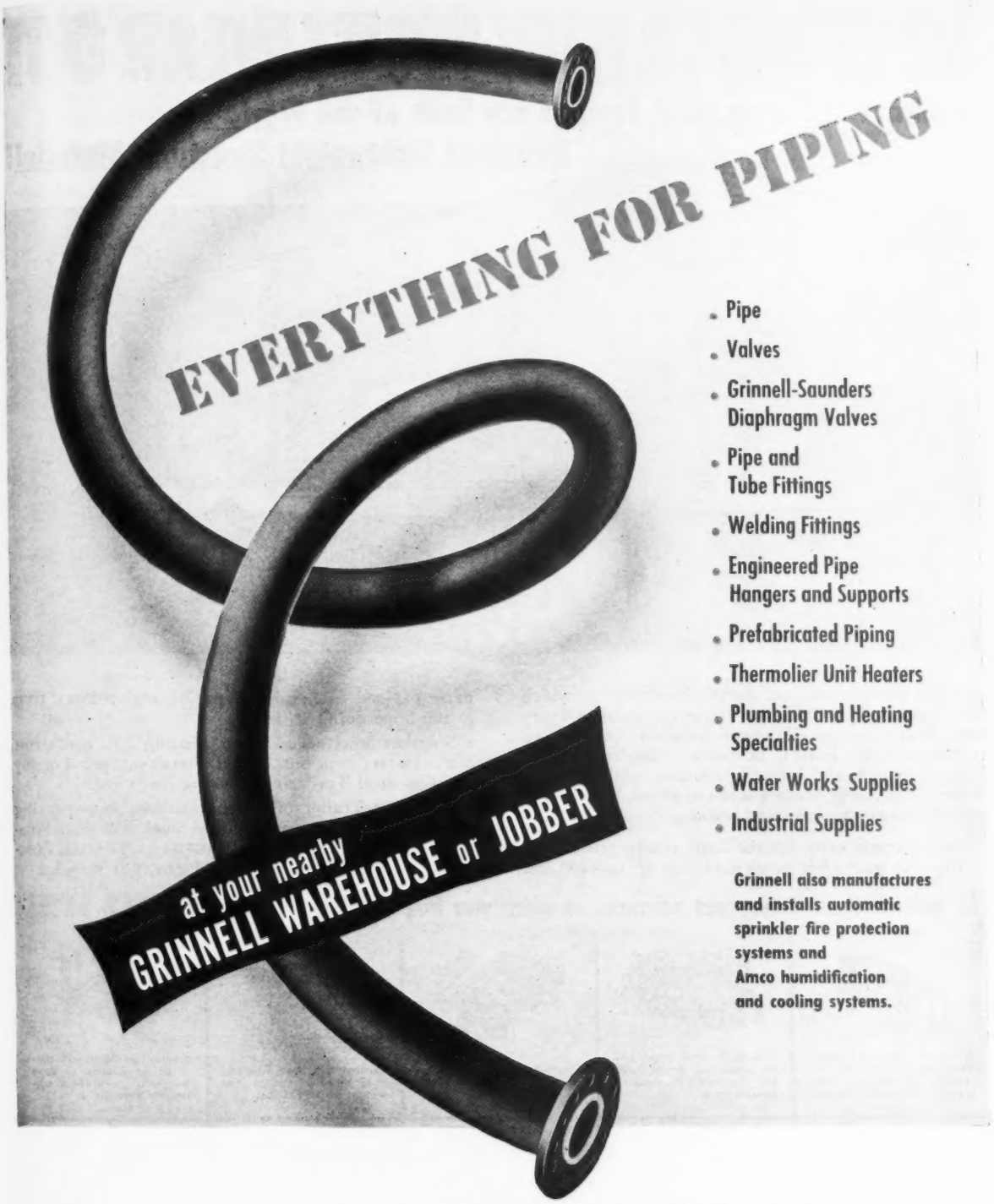


- Pipe
- Valves
- Grinnell-Saunders Diaphragm Valves
- Pipe and Tube Fittings
- Welding Fittings
- Engineered Pipe Hangers and Supports
- Prefabricated Piping
- Thermolier Unit Heaters
- Plumbing and Heating Specialties
- Water Works Supplies
- Industrial Supplies

Grinnell also manufactures and installs automatic sprinkler fire protection systems and Amco humidification and cooling systems.

More than 1000 Grinnell warehouses and jobbers . . . one within easy reach of your phone . . . are ready to give you prompt delivery on any standard piping product. When the job calls for specialized piping products or installations, Grinnell has the manufacturing facilities, products, experience and engineering knowledge to "deliver the goods".

GRINNELL

Grinnell Company of the Pacific. Branch warehouses: Fresno • Long Beach • Los Angeles • Oakland • Pocatello • Sacramento • San Francisco • Seattle • Spokane

NO WONDER THEY WON'T WEAR OUT

Fruehauf Stainless Steel Trailers are built of the World's Strongest Lightweight Structural Material!

Stand-up performance on the job is *one test* in which these hard-boiled "huskies" come up shining every time. That's because Fruehauf Stainless Steel is *one Trailer* that's not built to be babied. They're built for rugged strength and long-life stamina, with all basic structural members of the world's strongest lightweight material—corrosion-resistant Stainless Steel.

They're engineered, for the long, steady grind—day in, day out, year after year—carrying up to 4000 lbs. more payload . . . and still paring maintenance costs to the bone doing it, too.

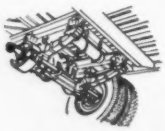
Stainless Steel never needs painting . . . won't rust out . . . won't wear out. In fact, there's no record of any Stainless Steel Trailer *ever having worn out.*

No other Trailer offers you the big money-saving advantages of operating Stainless Steel. Ask your Fruehauf man about them today. FRUEHAUF TRAILER COMPANY, Western Manufacturing Plant, Los Angeles.

You get all these important advantages when you buy FRUEHAUF STAINLESS STEEL!

All basic structural members are built of the world's strongest lightweight structural material.

Gravity-Tandem gives better springing, better braking because it employs torsion bars.

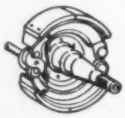


"Multi-Rate" Suspension gives better springing from no load to overload.

Vertical 2-speed Supports save time. Aluminum cuts weight up to 135 lbs.

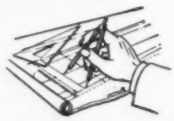
Magnesium floors cut hundreds of pounds of dead weight . . . without sacrificing strength.

Aluminum wheels save up to 186 lbs. per-axle over conventional steel wheels.



Pressed steel brake shoes save 40 lbs. per axle . . . afford smooth stops with heaviest loads.

Sleek streamlined styling identifies your operation with the most advanced hauling equipment on the road.



A full staff of qualified engineers are available to help you with special problems.

80 Factory Service Branches, coast-to-coast, offer you the best Trailer service in the world.

Sales and service: Los Angeles • San Francisco • Portland • Seattle
San Diego • Fresno • Sacramento • Spokane • Billings • Salt Lake City
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This Month in WESTERN INDUSTRY

VOLUME XV SEPTEMBER · 1950 NUMBER 9

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Self-Deception on Labor Costs
Keep Looking Westward

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Front Cover

The West has always been up front in printing; for example, the West Coast is the center of offset label printing in the United States. Picture shows the color mill room of The California Ink Company's plant in Berkeley, with ink in its semi-finished form pouring into containers from the rollers

NEXT TIME AN INSURANCE PROBLEM COMES UP IN YOUR FIRM . . . . . .

Call In Your Insurance Agent or Broker...

Insurance is an increasingly important matter in any business organization. Yours is no exception. You need the best possible counsel whenever an insurance question arises. Your insurance agent or broker is skilled in this field. He has an extensive background of experience on which you can and should draw. Call him in today!

Group insurance builds morale, helps establish financial security, and makes for greater efficiency among employees. Your insurance agent or broker can give you information on the modern group insurance plans underwritten by the sponsor of this message —

CALIFORNIA-WESTERN STATES LIFE INSURANCE COMPANY

Home Office, Sacramento

Recipe for more efficient steel production

Take coke produced from skillfully blended coals . . . combine with carefully prepared and sized iron ore . . . smelt in modern blast furnaces . . . add good operating practices . . .

There you have the answer to why the coke consumption per ton of pig iron at Kaiser Steel's Fontana plant is the lowest in the steel industry, winning national recognition.

Such efficiency, resulting from constant research, is another example of the *know-how* of the West's only integrated independent steel plant . . . which is bringing more industry, more jobs, more wealth to the West!

It's good business to do business with

Kaiser Steel

built to serve the West

PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • hot rolled strip • hot rolled sheet • alloy bars carbon bars • structural shapes • cold rolled strip • cold rolled sheet • special bar sections • semi-finished steels • pig iron • coke oven by-products
For details and specifications, write: **KAISER STEEL CORPORATION, LOS ANGELES, OAKLAND, SEATTLE, PORTLAND, HOUSTON, TULSA, NEW YORK**

New national advertising campaign to help bring more business into your community

"You can best serve all the West from Northern California." That's the theme of P. G. and E.'s national advertising which begins this month in some of the nation's most influential magazines. Objective is to encourage Eastern businessmen to move to Northern California.

Feature of the new campaign is Northern California's dramatic success story. The ads explain why this is the best location for serving the West—skyrocketing population, high per capita income, high farm profits, fine transportation, nearness to raw materials, low-cost power, pleasant California living.

Your community will benefit because every new factory and family contributes to the prosperity of the entire area, expands the market for your products and services . . . and provides an even better and more solid economic foundation for Northern California's growth in the years ahead.

Watch for the ads as they appear in these key publications. Combined circulation is 3,375,000 . . . with more than two million copies going to proprietors, directors, managers, officials and professional men—businessmen with the authority to decide on new developments in your community.

Your gas and electric rates are among the lowest in the nation

P·G·and E·

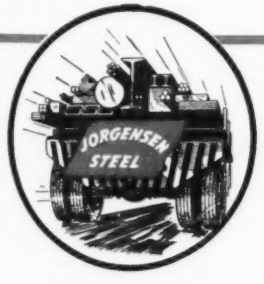
PACIFIC GAS AND ELECTRIC COMPANY

9AX-50

Steel Problems?

Call Jorgensen First

YOU'RE IN A FIX when your zipper sticks. But when your problem is *steel,* the solution is easy. Call Jorgensen and you'll get help *fast!* Jorgensen is *really* equipped to render a *complete* steel service. An organization trained in helping users select the *right* steel for the job, plus huge warehouse stocks of all the common carbon steels, such as bars, plates, sheets, structurals, etc., plus a *complete* line of alloy, stainless, tool and specialty steels, plus the most modern handling, cutting and delivery equipment available. For steel service plus—*CALL JORGENSEN FIRST!*



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STEEL

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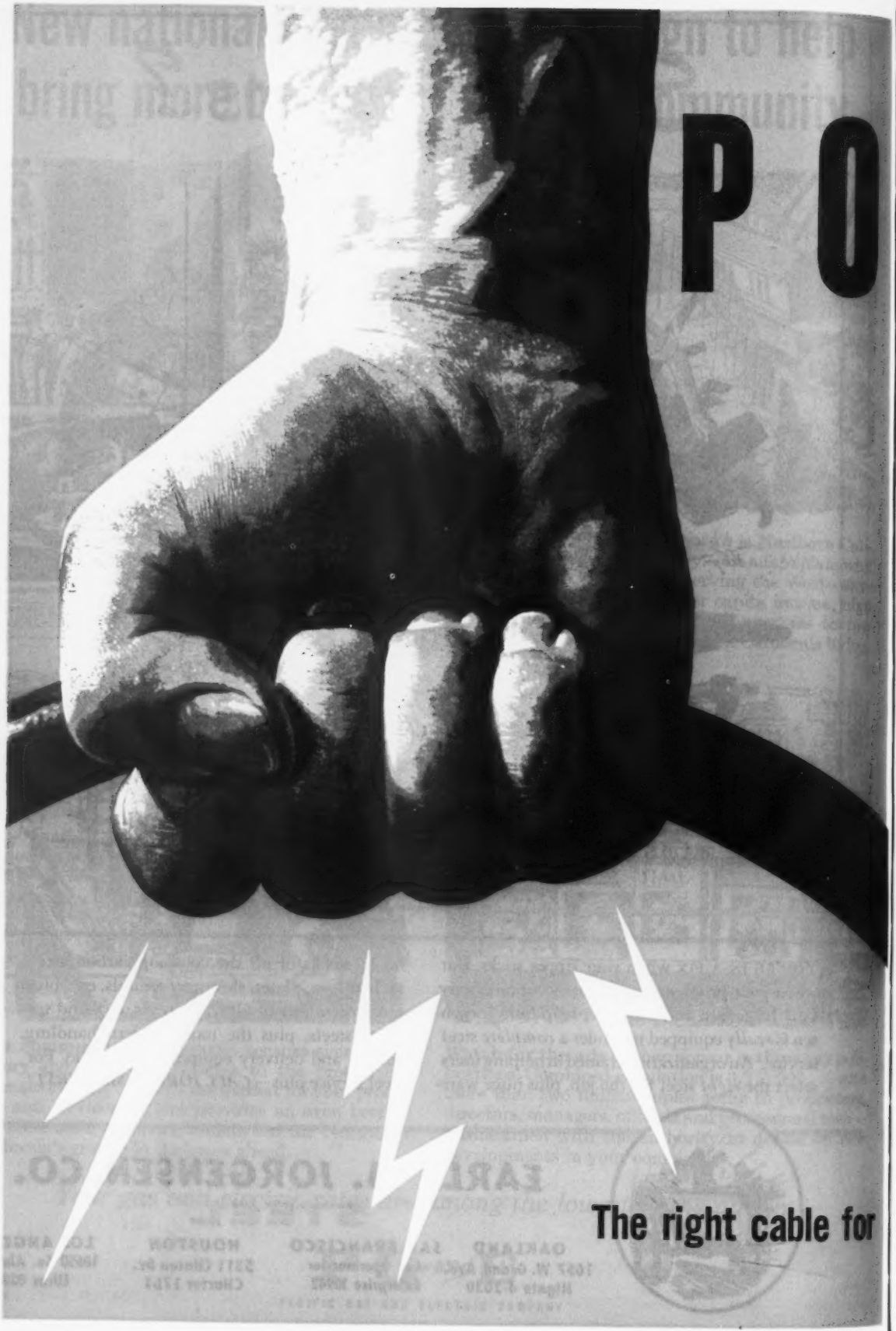

P O
The right cable for

WER UP

and be prepared!

THAT'S THE CHALLENGE to 9 out of 10 industrial plants—and yours may be one! It's the challenge to prepare those plants to make full use of electric power by modernizing obsolete, worn out wiring systems, by providing adequate wiring capacity *now* and for the *future*.

POWER UP—And Be Prepared! is Anaconda's new Industrial Wiring Modernization Campaign to help industry make full, efficient use of the electric power it buys . . . to eliminate costly power waste caused by overloaded circuits, worn out electrical equipment, inefficient distribution and failure to provide for added power loads.

LIKE ANACONDA'S previous industry-wide campaigns, "Industrial Modernization," "Preventive Maintenance" and "Wire Ahead," this newest Anaconda program is designed to enlist the engineering knowledge and skills of Electric Utilities, Contractors and Wholesalers in helping American industry to POWER UP—And Be Prepared!
Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

for the job

ANACONDA® Wire and Cable

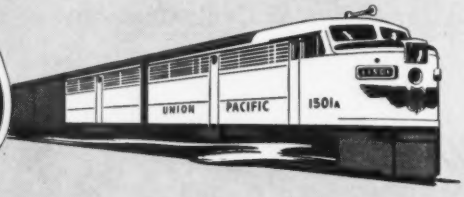
99 out of 100 . . . .

That's good shooting in any man's language. Records like that, in bluerock breaking or anything else, don't just happen. Experience and training play a large part.

Just recently, when Union Pacific hung up a record of 99.45% on-time delivery of perishable shipments, a major share of the credit was due the army of employees whose long experience, proper training and cooperative spirit made possible such a remarkable performance.

Naturally, Union Pacific wants its patrons to think well of the railroad. It is equally interested in knowing that its employees can truthfully say "The U. P. is a great railroad and we're going to keep it that way."

UNION PACIFIC RAILROAD



BE SPECIFIC: *Ship* UNION PACIFIC

Wiring for

heavier loads?

Unless you figure feeders in aluminum you don't

figure low

Be sure you get prices on your feeders both ways—in aluminum and in copper. You'll be surprised how much you can save with *aluminum*.

For names of manufacturers and copy of "Questions and Answers About Aluminum Conductors", call your nearby Alcoa sales office, or write ALUMINUM COMPANY OF AMERICA, 1781J Gulf Building, Pittsburgh 19, Penna.

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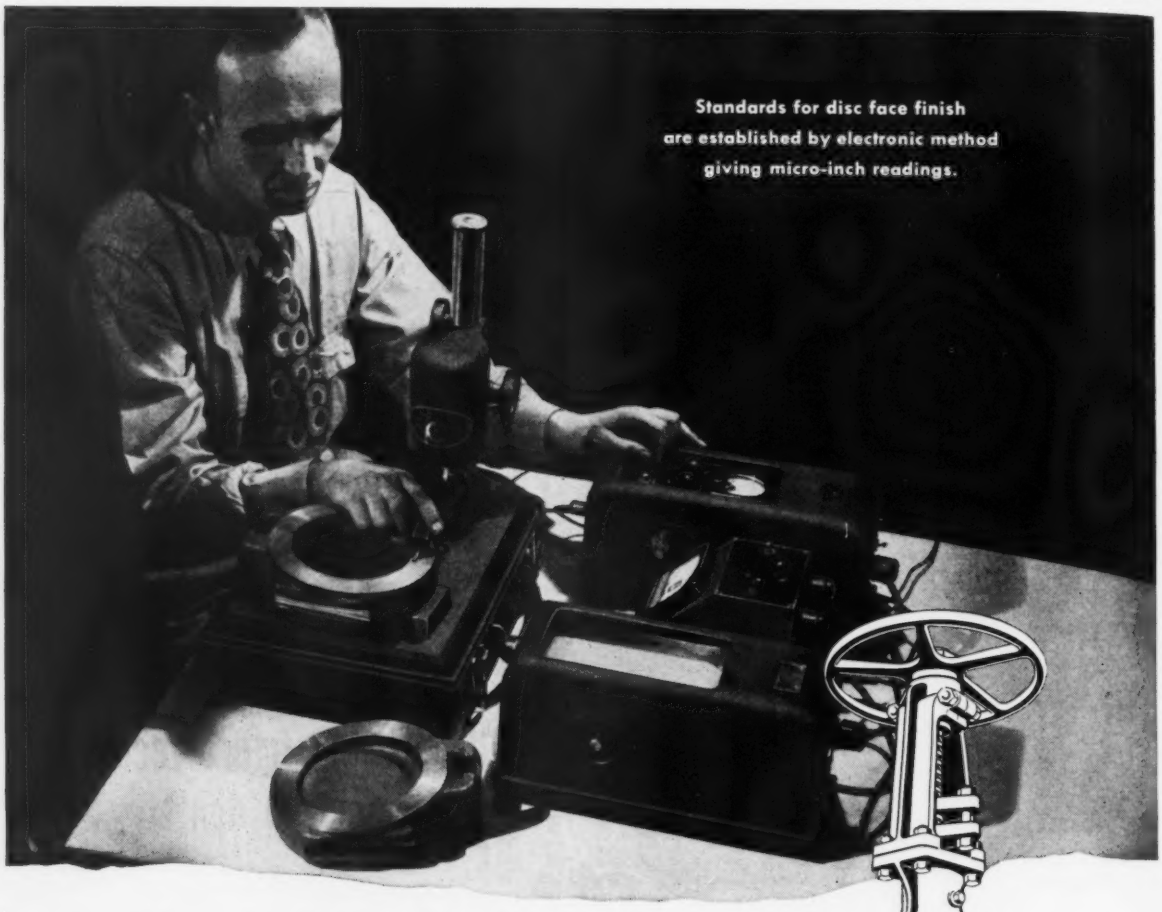
Aluminum Conductors

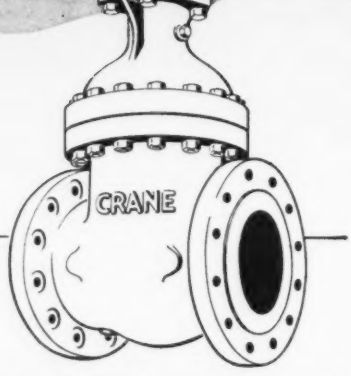
of ALCOA EC ALUMINUM are made by leading manufacturers

More **CRANE VALVES** are used than any other make



How CRANE controls quality to the Micro-Inch to cut your valve costs

Surface finish of a valve's working parts has a lot to do with its wear resistance and operating efficiency. A correct finish means a tighter-seating valve, easier operation, greater ease of maintenance. In Crane Quality valves, the surface finish of machined parts is measured and controlled to rigid limits. The standards for quality control of surface finish are determined by the most scientific methods as shown above. Yes, nothing is overlooked to make Crane Valves the lowest-cost valves in the long run. *That's Crane Quality!*



Precise quality control of materials, design, and manufacturing—to the highest degree in the industry—makes Crane valves the lowest cost valves in the long run. On steam service, oil and oil vapor lines, for example, you'll find Crane Steel Gate Valves a sure remedy for high maintenance costs. Talk it over with your Crane Representative.

CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

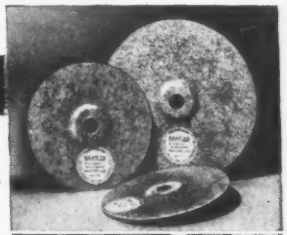
Bay State Proudly Hails....

AMERICA'S NEWEST, FINEST, FASTEST, LUXURY LINER . . .

"Independence"

Courtesy American Export Lines · Inc·

Launched June 3, 1950
Bethlehem Steel Co.
(Shipbuilding Division)
Quincy, Massachusetts
Maiden Voyage Feb., 1951



BAYFLEX® abrasive products played an important part in the building of this super liner . . . removal of rust and scale from steel plates before fabrication . . . grinding and finishing of welds . . . cutting metal parts such as cabinet doors, angles, joints . . . grinding stainless steel sinks . . . and innumerable other metal grinding, cutting and finishing jobs.

BAYFLEX® abrasive products might be the answer to <u>your</u> grinding problems. Write us for a free demonstration.

BAY STATE ABRASIVE PRODUCTS CO.
Westboro, Massachusetts, U. S. A.

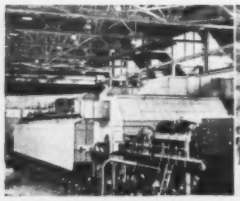
BAY STATE®

WEST COAST DISTRIBUTORS

PACIFIC METALS COMPANY, LTD.

NORTHWESTERN TOOL & SUPPLY CO., INC.

For Nearly 30 Years The Leading Builders Of



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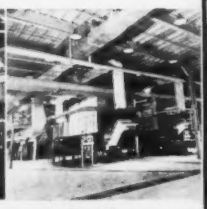
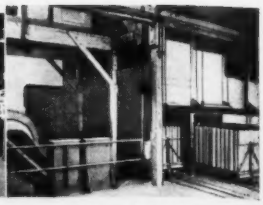


Textiles

ROSS SYSTEMS

Metal Finishing



General Drying

INDUSTRIAL AIR PROCESSING EQUIPMENT

AIR HEATERS	Direct, Indirect and Combination Types, Oil, Gas and Steam Fired	For use wherever a supply of hot circulated air is required—for industrial ovens, drying processes, building or space heating, Make-Up Air Systems, heat treating, foundry cupola heating, etc. Delivery temperatures up to 1000 deg. F.
INDUSTRIAL DRYERS	Batch and Continuous Types for Web or Particle Drying Using Any Source of Heat	In wide use for drying processes in such industries as ceramics, chemicals, drugs, pulp and paper, plastics, rubber, textiles, cork products, insulating materials, thread, floor covering, wall board and many others.
INDUSTRIAL OVENS	Batch and Conveyor Types for Temperatures Up To 1000 deg. F. For Baking, Curing, Heat Treating	Insulated panel constructed ovens for such operations as metal finishing and decorating, core baking, wire and rod baking, heat treating castings, etc. Complete paint, lacquer, enamel, japan and porcelain baking systems covering spraying, rust proofing, drying, cooling apparatus.
HEATING and VENTILATING, AIR CONDITIONING	Industrial Hoods, Air Supply and Exhaust, Duct Work and Control Apparatus	Individually designed air systems for heating, ventilating and conditioning all departments of paper, textile and similar plants. All necessary apparatus for air make-up, supply, distribution and exhaust to control temperature and humidity for improving working and operating conditions, removing fog and vapor, preventing damage from condensation, cooling motors, generators and similar functions.
WASTE HEAT RECOVERY	Heat Interchanges and Economizers for Waste Vapor and Gases	For full utilization of heat units in waste vapor or gases to provide reclaimed heat for buildings, water, etc. to reduce steam and fuel costs.

Our large staff of experienced engineers plus our complete research and testing laboratory along with our two modern manufacturing plants in New Brunswick, N.J. and Montreal, Canada are all available to ROSS clients.

ROSS SYSTEMS

J. O. ROSS ENGINEERING CORPORATION

MANUFACTURERS OF AIR PROCESSING SYSTEMS

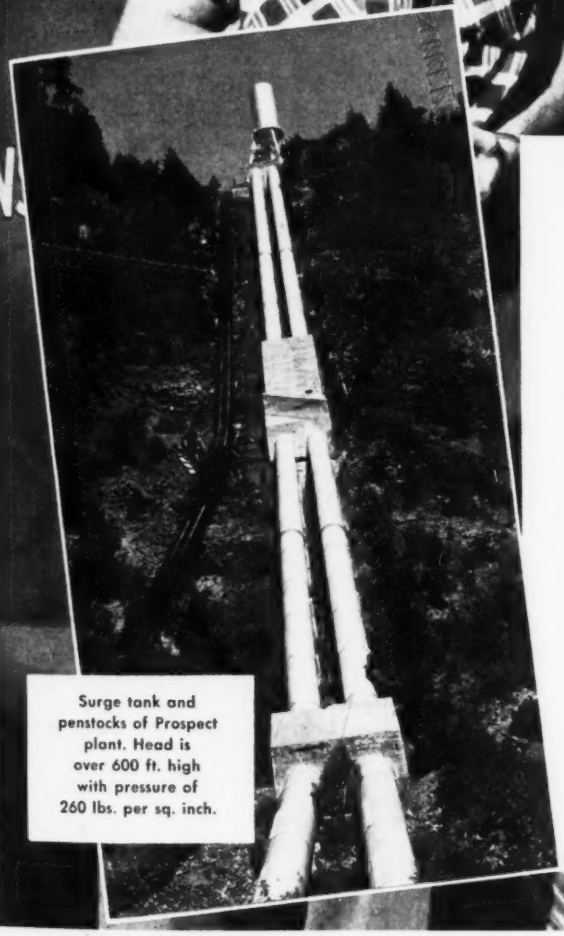
444 MADISON AVENUE NEW YORK 22, N. Y.

600 ST. PAUL AVENUE LOS ANGELES 17

"Bearing Temperatures Lower ...with Gargoyle"

"Lower bearing temperature means less wear and that's what we get using Gargoyle D-T-E heavy medium" — says Oscar H. Brenneman, Superintendent of Production for the California-Oregon Power Co.

M. M. Huggins, G. P. representative at Medford, Oscar H. Brenneman, superintendent of production for the California-Oregon Power Co.



Surge tank and penstocks of Prospect plant. Head is over 600 ft. high with pressure of 260 lbs. per sq. inch.

For 12 years this company's generators, water wheels and other equipment have used G. P. lubrication service. Today this includes 7 units on the Rogue River, 4 on the Umqua, 8 on the Klamath and 3 on Fall Creek. Eight new plants under construction on the North Umqua will increase the system's capacity by 150,000 kilowatts. One of these will have a head of over 1000 feet — one of the highest in the country...all will use Gargoyle D-T-E oils in circulation systems.

Take Advantage of this G. P. Service

The G. P. Lube-Engineer is an expert trained to save you money through proper lubrication. The preventive-maintenance program he will put into effect for your equipment will result in longer machinery life, simplified lubrication methods, less buying and stocking problems.

General Petroleum
CORPORATION
using nature's gift to better mankind

Mobilgas Lubricants

Land of the free!

. . . where enduring copper is a symbol of our better way of life . . . where copper and its alloys provide a myriad of useful, low-cost, mass-produced conveniences. Take this Jarco Key-Chain Flashlight: Solid brass deep-drawn shell and cap; solid brass screw-machined, threaded and knurled nut; solid brass bead chain; battery, tension spring and focused bulb. Made by Jarco Metal Products Corporation, New York. Sold by the millions at 39¢ retail.

Twenty years—

That's not a sentence. It's a guarantee that goes with every automatic water heater sold by Bauer and Company of Hartford, Conn. One big reason why is that Everdur*, carbon-arc welded, is used for the non-rust tank. Coincidentally, twenty years ago the Bauer Company discovered the merits of this Copper-Silicon Alloy—strength, corrosion resistance, workability and weldability—and has been using it ever since for tanks ranging from 2½ to 150 gallons. Dependable stuff, that Everdur.

*REG. U.S. PAT. OFF.

P.S. If you are having difficulty in selecting a metal for a particular application, let us help you with it. Talking about it entails no obligation—and our vast experience places us in a position to come up with the right answer. Address The American Brass Company, Waterbury 20, Conn.

Anaconda

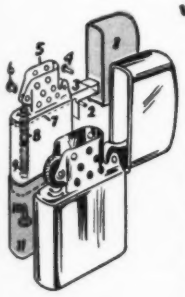
It works—weather or not

When the H. S. Getty Company, Inc., Philadelphia, designed its "Internal Gear Construction Window Operator," many difficulties presented themselves. First, it had to be non-rusting, corrosion resistant and yet moderate in cost. Regular brass alloys answered that. But—some parts, such as the operating arm and machine-cut worm, needed extra strength and stamina to resist the stresses caused by rain-swollen or iced-up sash. Everdur, The American Brass Company's Copper-Silicon Alloys answered *that* . . . proving what we've been saying right along—that there's an Anaconda Copper Alloy available to do 'most *any* kind of job. And economically, too!

Schenley sets up a tall one

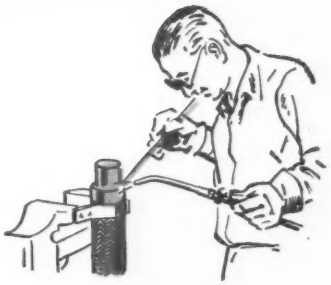
Ever wonder why copper has been used so long—and so diversely—in breweries and distilleries? The question is prompted by this three-story still, one of the many pieces of equipment made of copper in the new Canadian Schenley Limited distillery at Valleyfield, Quebec. The answer: Copper is readily worked into the unusual shapes and forms required; it provides high corrosion resistance, and never rusts to contaminate products; it's tops in rapid heat transfer; it can be readily and dependably joined by soldering, brazing, oxyacetylene welding, or by the newer carbon arc, inert-gas-shielded welding method. Most of the equipment for the Schenley plant was fabricated in Canada by Canadian-Vickers Limited of Montreal—of Anaconda Copper, of course.

Metals at work



"No Zippo owner ever spent a cent for repairs"

That is the unqualified, unconditional guarantee held by millions of Zippo Lighter owners. How does Zippo do it? First, the design is excellent. Second, meticulous care is employed in manufacturing. And third, the right metals are used in the right places . . . metals that are easy to fabricate, economical to finish and that do their assigned jobs for years on end. You guessed it. Eleven components of the Zippo Lighter are made of Anaconda Brass and Nickel Silver Alloys in the form of strip, wire, rods and tubes.



We take our own medicine

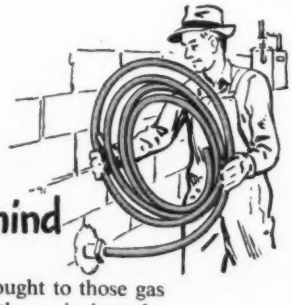
And it's good! For years we've been extolling the merits of welding with Bronze. Then our subsidiary, the American Metal Hose Branch ran into a toughie—braze-welding the fittings on these 2½″ diameter Vibration Eliminators for refrigeration lines. The assembly includes a thin-wall flexible bronze tube, a rigid copper tube fitting, a copper ferrule, and—672 strands of .028″ bronze wire. Result: a strong, ductile, vibration-resistant weld, absolutely leakproof against the most searching refrigerants. Want a booklet on Anaconda Bronze Welding Rods? Ask for Publication B-13.

Stuffed with Copper

Ever since The American Brass Company developed a means of producing electrolytically deposited copper in practically unlimited lengths, new uses for this paper-thin metal pop up continuously. Most recent is the application of "Electro-Sheet" in Multi-Velocity Air Filters, made by Research Products Corp., Madison, Wis. The copper, slit and expanded, has important advantages over other materials: Light weight, high dirt-holding capacity, non-clogging and improved cleanability features; and lower restriction at all air velocities up to 550 feet per minute. Just in case you want to know, "Electro-Sheet" is available in thicknesses from .00068″ to .0094″, in widths up to 62″.

Look this way, please

Designed to sell at $14.95, the Beacon "225" Camera, produced by Whitehouse Products, Inc. of Brooklyn, N. Y., introduces a degree of precision befitting much more costly cameras. Handsomely styled, the Beacon "225" uses standard film and is inexpensive to operate. This policy of offering high-quality at low-cost has met with marked success, for more than 300,000 Beacon Cameras have been sold to date. Dozens of the intricately formed camera parts, made of copper base alloys, were produced by our Waterbury Brass Goods Branch—in large quantities, inexpensively, to unusually close tolerances in multiple die production. If you're interested in this type of work your sample, sketch or description will start the ball rolling. 5099



Out of sight but not out of mind

Maybe you never gave a thought to those gas service lines that run from the main into the house. But you can bet your gas company does, for replacing rusted out steel services is a major item of maintenance expense. So . . . twelve years ago a large midwest utility started replacing gas service lines with copper tube—very often eliminating trenching by pulling the smaller 1″ or 1¼″ tube through the reamed-out steel pipeline. 25,000 replacements have been made by this one company alone, and—surprise—the total cost of a rust-free copper renewal is considerably less than that of a steel replacement!

ANACONDA

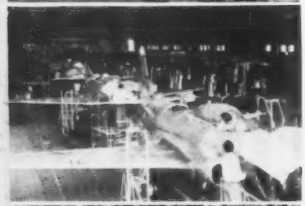
the name to remember in

COPPER, BRASS & BRONZE

WESTERN INDUSTRY

Take a look NOW . . . Plan to be in our ANNUAL REVIEW AND FORECAST ISSUE

Out January 10. Final forms close December 10.



What has happended in the industrial West during 1950?

What is the outlook for 1951?

What effect will these developments have on Western production and marketing plans?

No one has all the answers, but WESTERN INDUSTRY's January ANNUAL REVIEW AND FORECAST certainly will provide some guide posts.

EXTRA ADVERTISING VALUE FOR YOU

If your products or services are used by industry in the West—then you belong in our January ANNUAL REVIEW AND FORECAST issue. It is firmly established and regarded as authoritative by the West's top management and production men. It is aimed at 9,000 men who actively *manage* and *buy* (specify and approve purchases) for Western plants. The issue will have permanent reference value—a bonus for all advertisers.

EDITORIAL PLANS

1 ***Industry-by-Industry Summaries and Trends***—Once again our editors will review the principal industries of the West. These reviews will present production figures; summarize significant manufacturing, processing and equipment developments of the year; forecast trends on a State by State basis. Here are specific industries we expect to cover:

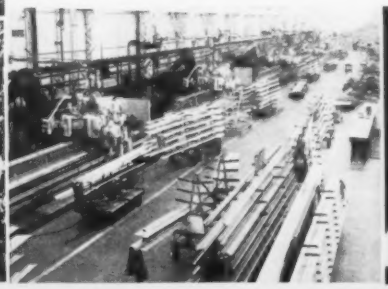
Metals	**Gas**	**Aircraft**	**Sugar**	**Plastics**
Iron and Steel	**Coal**	**Canning and Packing**	**Furniture**	**Automobile assembly**
Aluminum	**Electric Energy**	**Fruit and vegetable**	**Rubber**	**automobile parts**
Copper	**Lumber**	**Fish canning**	**Motion Pictures**	**Apparel**
Chemicals	**Plywood**	**Frozen foods**	**Electronics**	**Glass**
Petroleum	**Pulp and Paper**	**Flour**	**Ceramics**	**Cement**

2 ***World Situation and the West***—Population and production capacity in the West gained tremendously during World War II. WESTERN INDUSTRY will cover that growth, and point out the industrial and economic developments likely to follow as a result of present world conditions.

3 ***Analysis of Western Production Facilities and Natural Resources.***

4 ***The Import of 1950 Census Figures for the West.***

5 ***Comments by Business Leaders***—What to look for in 1951, according to the views of top management in the West.



Start Your 1951 Advertising Schedule With Dominant Space in This Issue!

FAN MAIL

"Beyond and aside from your Annual Review and Forecast issue, my best wishes for continued success in the splendid work that your publication is doing for Western industry and business."
Walther Mathesius, President
Geneva Steel Corporation
United States Steel Corporation Subsidiary

"May I congratulate you on the excellence of WESTERN INDUSTRY. I could offer no suggestions for improving the caliber of your editorials, as to my knowledge they have always been constructive, varied, and of general interest."
Louis Buchman, General Manager
Utah Copper Division
Kennecott Copper Corporation

"Your January Annual Review and Forecast issue is an excellent resumé of the actuals and potentials of Western industry. I am circulating this issue to the vice-presidents in charge of our four major product divisions, so that they may see the opportunities that lie in the Western states."
J. P. Margeson, Jr., Executive Vice-President
International Minerals & Chemicals Corporation

"I have examined with great interest, the Annual Review and Forecast issue of WESTERN INDUSTRY. There can be no question but the information and data presented in this number give striking evidence of the tremendous growth which is taking place in the West."
I. W. Wilson, Senior Vice-President
Aluminum Company of America

"I think your Review and Forecast Number is without question one of the most complete and comprehensive editions I have seen presenting information of interest to all industries. I assure you that we shall use your publication as a valuable guide and reference.
F. M. Hawley, President and General Manager
Morse Chain Company, Detroit

"Perhaps you would be interested in learning that we will be able to use information from this fine periodical for an editorial in a company magazine just being started, besides making us feel that we are "keeping our fingers" on what is happening in the eleven Western states."
C. E. Kuster, Terminal Manager
C-Transcon Lines, Los Angeles

"As an indication of the value we place upon your Annual Review and Forecast Number, I think you will be interested to know that we have ordered copies of the magazines for each of the resident managers of our mills and converting plants."
R. G. Shepherd, Executive Secretary to the President
Crown Zellerbach Corporation, San Francisco

"We have never been disappointed. Our Western business has grown with the West. For this reason we naturally were interested in your "Annual Review and Forecast" number. It convinces us once again that our faith in Western business is justified and our investment there is a good one. Your "Annual Review and Forecast" does a fine job of serving your readers."
Charles R. Tyson, President
John A. Roebling's Sons Company, Trenton

"Mr. Lawson and members of his staff rely on *Western Industry* to keep abreast of developments in their area, and from time to time refer special articles to New York."
P. P. Pratt, Assistant to Vice-President
Manufacturing and Engineering Department
General Foods Corporation

Plan your 1951 schedule to include *Western Industry's* 2 other special issues: March, Metals number; and August, Materials Handling and Packaging number.

FULL EFFECTIVE COVERAGE

Excerpts from letters to us about our 1950 Annual Review and Forecast give you an idea of the recognition it received . . . and we believe the 1951 issue will be even better.

No other magazine, Western or national, will cover so completely industry in the West. It will be packed with information that buyers in this fast-growing market want and need. So don't miss it. Tell your sales story to this important market by reserving space NOW for *Western Industry's* January ANNUAL REVIEW AND FORECAST issue.

For best position, state advertisement size, and whether color or bleed. Remember, forms close December 10.

NO INCREASE IN RATES

While the January number is sure to have extra interest for readers (and for you) our regular rates apply, as shown here:

ADVERTISING RATES

(Based On Total Bulk Space Used in 12 Months)

Full Page Space	
24 pages or more	$185.00 per page
12 to 23 pages	200.00 per page
6 to 11 pages	225.00 per page
3 to 5 pages	240.00 per page
Less than 3 pages	255.00 per page

Fractional Space	1 time	6 time	12 time
2/3 page	$170.00	$160.00	$150.00
1/2 page	127.50	120.00	112.50
1/3 page	85.00	85.00	80.00
1/4 page	63.75	63.75	60.00
1/6 page	42.50	42.50	42.50
1/8 page	31.88	31.88	31.88

Color Charges	1 page	2 pages facing
Red, orange or yellow	$55.00	$80.00
Other colors	65.00	90.00
Metallic colors	70.00	95.00

Bleed Borders		
Bleed top, bottom or outside	20% extra	15% extra
Gutter bleed	No charge	No charge

Inserts
Inserts billed at earned black and white page rate. No extra charge for backup either single leaf or spread (4-page form).

Composition—No charge.

Preferred Positions (Non-cancellable).

Page facing second cover	10% premium
Page facing contents page	20% premium
Page facing first editorial	20% premium
Page facing first reading	20% premium
Any guaranteed regular position (other than preferred)	10% premium

NOTE: Island ½-page positions (4⅝" x 7½") cost 20% extra.
Write for availability of cover positions and rates.

CASH IN ON THIS MARKET NOW!

To sell profitably to this market, and keep it sold, put WESTERN INDUSTRY on your national sechedule NOW.

WESTERN INDUSTRY
609 Mission St., San Francisco 5, Calif.

Yes, I want

- ☐ **to reserve ..... pages in January, 1951 Annual Review and Forecast**
- ☐ **additional data on *Western Industry*, its circulation and editorial content; its market.**
- ☐ **a copy of 1950 Annual Review and Forecast issue.**

Name.....Title.....
Company.....
Street.....
City.....Zone.....State.....

WESTERN INDUSTRY
609 Mission Street, San Francisco 5, California • YUkon 2-4343

DATA UNITS AVAILABLE

WI-1—NIAA Sales Presentation
WI-2—How to Determine Editorial Effectiveness
WI-3—Helpful ABC's for Exhibitors at Trade Shows, etc.
WI-4—The Industrial Market of the West
WI-6—Your Added Market in the West for the Next 10 Years
WI-7—1949 Editorial Index of Articles
WI-8—How to Make Your Product One of the 2.7 Considered by Each Buyer

NEW YORK—Franklin B. Lyons, Mgr.
Weston Road, Georgetown, Conn.
Telephone Georgetown 374

CLEVELAND—Richard C. Burns, Mgr.
7708 Deerfield Drive, Cleveland 29, Ohio
Telephone TUxedo 5-1848

CHICAGO—A. C. Petersen, Mgr.
3423 Prairie Ave., Brookfield, Ill.
Telephone Brookfield 532

SAN FRANCISCO—V. C. Dowdle, Mgr.
609 Mission St., San Francisco 5, Calif
Telephone YUkon 2-4343

LOS ANGELES—J. E. Badgley, Mgr.
1228½ S. Bronson Ave.,
Los Angeles 6, Calif.
Telephone REpublic 2-3125

BIG

BIG FORGINGS ?...

let NATIONAL *make them*

These 11,000 pound Exchanger Channel Forgings were hammered out right on schedule at National's Torrance plant.

This is just one sample of the many types of heavy manufacturing jobs National is equipped to handle in our one integrated plant, the largest in the West.

You may have similar heavy manufacturing jobs, if so—call us. In the meantime, send for our free booklet, "From Melting Furnace to Finished Product".

THE NATIONAL SUPPLY COMPANY
Industrial Products Division
Torrance, California • Los Angeles Area
IDEAL PRESSED STEEL FORGINGS,
BILLETS AND LARGE BARS
STEEL CASTINGS AND SPECIAL MACHINERY

THE NATIONAL SUPPLY COMPANY

MELTING • FORGING • CASTING • MACHINING
HEAT TREATING • ASSEMBLING • WELDING • TESTING

IN OUR MAILBOX

Find Survey Interesting

Editor, Western Industry:

We have read the article on machine loading: while we are not qualified to speak with authority on its application to other industries, a brief statement on what we do may serve your purpose.

Our machines are segregated into groups for load purposes. All machines in a given group can handle the same type of work. The weekly working capacity for the group is determined by multiplying the number of machines by the length of the scheduled work week.

We load into this working capacity on the basis of time determined from standard data. The ration of work done to capacity available is our machine group efficiency. Work not completed during the current week is rescheduled for the following week.

One of the basic difficulties with many machine-loading practices is the clerical work is so cumbersome that the Production Department is unable to keep current with its work.

Your survey of methods and systems in Western plants was interesting.

J. C. Maezer,
Factory Manager,
The Cleveland Automatic Machine Company,
Cincinnati, Ohio.

Tailored Machine Loading

Editor, Western Industry:

It is our considered opinion that machine loading is a factor in production engineering which should be tailored to the product, the production facilities, plant arrangement, and sales of each establishment.

In our particular case we have certain departments where machine loading works quite satisfactorily. In other departments, due to the nature of the product or its relation to the whole of our manufacturing facility, machine loading is not very desirable.

We feel that the advantages of machine loading must be qualified with an outline of the conditions under which the machine loading proved advantageous.

James Meehan,
Browne & Sharpe Co.,
Providence, Rhode Island.

Let The Buyer Be Aware

Editor, Western Industry:

General Feldman is most appreciative of your thoughtfulness in sending him advance proofs of the article concerning Government procurement, in the July issue of *Western Industry*.

We certainly would appreciate half a dozen copies of the reprint for distribution to our key procurement personnel.

Don Craig,
Chief, Office of Technical Information
Office of the Quartermaster General

Helps Market Research

Editor, Western Industry:

We find the information in your magazine *Western Industry* very helpful to us in connection with our market research program.

A. MacGillivray,
Vice President,
Gladding, McBean & Co.,
Los Angeles, Calif.

EDITORIAL COMMENT

Self-Deception on Labor Costs

IT IS evident that we still have a long way to go here in the West on understanding labor costs and devising means to control them. Although practically every one of the 211 Western plants included in the survey of operating methods and practices now appearing in *Western Industry* reported in the August issue that they knew their direct labor costs, and nearly as many said they knew their indirect labor costs also, their statements as to what they were doing to control these costs indicated that most of them were not as wise as they thought they were.

We had the benefit of some excellent analysis by highly qualified individuals of the reports on labor costs. In some supplementary comment they point out, first of all, that when wages and salaries constitute the largest single block of expense, as is generally the case, it requires skillful exercise of management techniques and controls to regulate this expenditure effectively and obtain optimum utilization of the labor services purchased.

Secondly, they point out that costing and pricing products on a realistic basis is dependent on full and accurate knowledge of labor costs. To insure an accurate measure of the relative amount of profit in each item and size it is essential to determine direct and indirect labor costs accurately, and properly associate them with the specific products by type and size. In other words, you have to know which items are earning their keep and which are riding on a free meal ticket. To achieve this result, accurate standards and budgets have to be set up and *kept in use*.

Various auxiliary cost control devices can help foremen and other levels of management to attain expected cost performance. Wage incentives in particular provide an effective avenue for reducing and standardizing direct labor costs, because as standard performance is obtained and exceeded unit costs are reduced with each increasing per cent of performance. Use of productivity indices in terms of man hours per unit of product, our analysts suggest, can be utilized effectively, and trend data by individual producing units, in terms of such indices is very helpful in appraising performance results and the extent to which labor utilization objectives are realized.

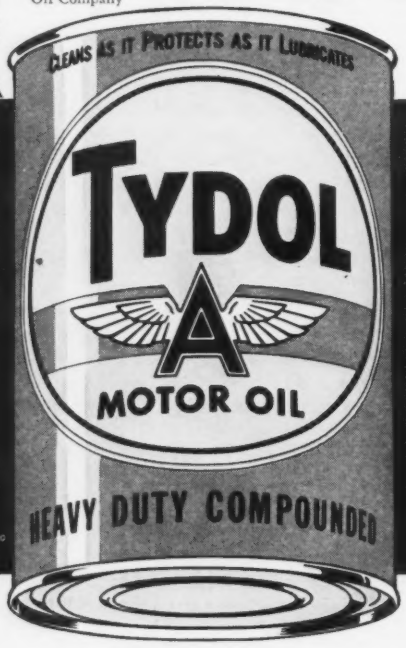
But all of these plans go for naught if they are not followed up and the results analyzed so that corrective measures can be taken.

Keep Looking Westward

INDIA sent a trade commissioner to this country recently to see what business could be developed between the two nations. He sailed from San Francisco the other day with orders from American department stores for $200,000 worth of rugs as a starter. India, in turn, could use a lot of machinery, but American machinery manufacturers seem to be too busy supplying Europe. Why not have some machine builders in the Far West whose eyes are fixed primarily on the Far East? Call it a pipe dream if you will, but more than one dreamer has built himself a fine business out of the fabric of those very dreams. It is a long cry to think of the machine tool center moving westward, but pioneers usually don't bother too much with history.

Copyrighted 1950
Tide Water Associated
Oil Company

SAFEGUARD YOUR ENGINE



CLEANS as it PROTECTS as it LUBRICATES

Three great new Tydol Heavy Duty Compounded Motor Oils solve every lubrication problem of gasoline, diesel or butane–automotive or stationary engines!

New Tydol HD, HD S-1, HD S-2 solve every problem of modern lubrication for automotive and stationary engines using gasoline, butane or diesel fuels. Tydol Heavy Duty Motor Oils are made of high quality, high VI paraffinic base oil compounded with the new types of "additives." Tydol cleans as it protects as it lubricates.

TYDOL HD

Especially recommended for high speed diesel, gasoline, butane fueled engines in automobiles, buses, trucks, tractors, stationary units under normal Heavy Duty conditions. SAE grades 10, 20, 30, 40, 50. Sold in drums and cans.

TYDOL HD S-1

Has higher detergency level than Tydol HD. For operation under cold start and stop conditions and under unusually severe continued overloaded conditions in all types of engines. SAE grades 20, 30, 40. Sold in drums.

TYDOL HD S-2

Has highest detergency level of the Tydol Heavy Duty series. For high performance and supercharged diesel engines using all kinds of diesel fuels under the most extreme conditions. Available in SAE grade 30. Sold in drums.

Call your Associated Representative for expert help on any lubrication problem.

CHECK THESE TYDOL SAFEGUARDS

- ✓ Easier starting—heat resistant—stable in service.
- ✓ Contains anti-foam agent and assures positive lubrication. Low oil consumption.
- ✓ Prevents sludge and varnish deposits and clogging of oil ducts and passages.
- ✓ Freedom from ring sticking—less piston ring and cylinder wear.
- ✓ Insures free acting valve stems. Provides cleaner filter elements.
- ✓ Non-corrosive to alloy bearings and other engine parts.
- ✓ *Cleans* as it *protects* as it *lubricates.*

TIDE WATER ASSOCIATED OIL COMPANY

CALENDAR OF MEETINGS

Sept. 10-13—Northwestern Section of International Association of Electrical Inspectors, at New Washington Hotel, Seattle. Contact W. L. Gaffney, Secretary, 402 City Hall, Tacoma 2, Washington.

Sept. 13-15—Pacific Electronic Exhibit (sixth annual) at Long Beach Municipal Auditorium. IRE coast convention concurrently.

Sept. 18—Northwest Industrial Research Conference, at Portland, Ore. Sponsored by Raw Materials Survey and the Industrial Department of Portland Chamber of Commerce.

Sept. 26-28—American Oil Chemists Society, at San Francisco. Contact Dr. E. B. Kester, Research Lab., U. S. Dept. of Agriculture, 800 Buchanan St., Albany, Calif.

Sept. 28-31—American Mining Congress—Metal Mining—at Salt Lake City, Utah.

Oct. 4-7—American Association of Port Authorities, at San Francisco. Contact Arthur Abel, Pres., Port of Oakland, California.

Oct. 16-17—Western States Council, annual meeting, Reno. Contact Gus P. Backman, president, care Salt Lake City Chamber of Commerce.

Oct. 16-18—National Defense Transportation Association, at San Francisco. Contact James A. Sullivan, Public Information Division, Ft. Mason, San Francisco, Calif.

Oct. 16-20—International Air Transport Association, at San Francisco. Contact Rudolph Feick, Secretary, 11 Broadway, New York.

October 17-19—24th Pacific Coast Management Conference at Hotel Claremont, Berkeley, California. Sponsored by California Personnel Management Association.

Oct. 19-20—American Ceramic Society, at San Francisco. Contact Dr. J. A. Robertson, Westvaco Chlorine Products Corp., Box 1061, Newark, California.

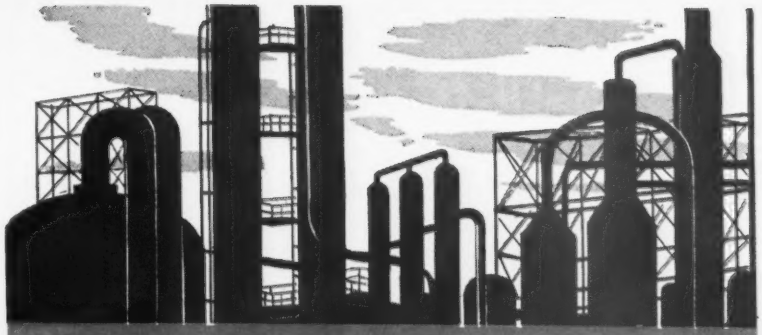
October 23-25—Pacific Logging Congress, at Multnomah Hotel, Portland, Ore. Contact Carwin A. Woolley, AT. 7971, Terminal Sales Building, Portland.

October—National Beverage Exposition, at San Francisco (tentative).

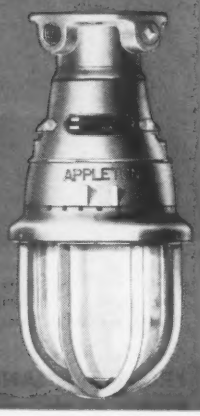
Nov. 15-18—National Paint, Varnish, & Lacquer Association, at San Francisco. Contact Jos. F. Battley, Pres., 1500 Rhode Island Ave. N. W., Washington 5, D. C.

Nov. 27-28—Pacific Northwest Trade Association, at Olympic Hotel, Seattle, Washington. Contact D. C. Knapp, Executive Secretary.

December 4-5—Northwest Frozen Foods Association, at Multnomah Hotel, Portland. Contact E. M. Burns, BR. 7074, Northwest Frozen Foods Association, Title and Trust Bldg., Portland.



Two Famous APPLETON "FIRSTS"



Type EVX—Vented Explosion-Proof Fixture
Pat. Applied For

Type EFU—Fluorescent Explosion-Proof Fixture
Pat. No. 2,392,202

These two specialized lighting fixtures were developed by Appleton engineers to provide safer, more efficient light for oil refineries, chemical plants, hospital surgeries—all locations where explosive or ignitible vapors, dusts or gases are present.

With the Type EFU Fluorescent Fixture, Appleton introduced the advantages of fluorescent lighting to the hazardous locations of industry. This fixture is easily installed, conveniently serviced. It may be hung horizontally or at an angle of forty-five degrees.

The Type EVX is the first and only Vented Explosion-Proof Lighting Fixture. Featuring porous metal cylinders, this fixture weighs thirty percent less than fixtures of similar performance rating, yet diffuses ten percent more light while operating at substantially reduced temperatures.

Whatever your illumination or electrical fitting requirements, specify Appleton—pace-setting manufacturer of electrical equipment for nearly half a century.

Sold Through Electrical Wholesalers

APPLETON ELECTRIC COMPANY

1740 Wellington Avenue • Chicago 13, Illinois

Branch Offices and Resident Representatives in All Principal Markets

APPLETON ELECTRIC PRODUCTS

APPLETON

CONDUIT FITTINGS · LIGHTING EQUIPMENT · OUTLET AND SWITCH BOXES · EXPLOSION-PROOF FITTINGS · REELITES

U. S. FLEX Chooses BUTLER Buildings

Butler Building used as warehouse and office by Seattle branch of U. S. Flexible Metallic Tubing Co. Note specially adapted front and sidewalls.

. . . for These Outstanding Features

- Speedy Erection
- Dependable Service
- Attractive Appearance
- Complete Adaptability

FROM LOS ANGELES, F. A. McDONALD, *General Manager, U. S. Flexible Metallic Tubing Co.,* Writes . . .

"A number of oil company engineers have complimented us on the appearance of our Seattle Butler Building, and several mentioned interest in this type building for their own storage and operation facilities. All agreed that the building was entirely practical for our type industry, which is a combination of warehousing, sales and service.

"A report received from our Seattle manager states that our building went through a storm of hurricane proportions which hit the Northwest, without a leak or visible signs of other damage.

"Our Seattle members are very happy to be in the new location and our other branches are anxious to have a duplicate set-up in the respective cities."

The U. S. Flex Co.'s Seattle building was occupied just one month after foundation work was begun!

Interior view of U. S. Flex warehouse shows full usable space provided by Butler Buildings.

For a Butler Building to Fit Your Needs, See Your Butler Distributor, or

BUTLER

BUTLER MANUFACTURING COMPANY

RICHMOND, CALIF.
KANSAS CITY, MO.
GALESBURG, ILL.
MINNEAPOLIS, MINN.

Mail This Coupon TODAY!

Address Dept. W129
Richmond, Calif.

Send full information about Butler Buildings for use as_____

Name_____

Firm_____

Address_____

City_____ Zone_____ State_____

THE WESTERN OUTLOOK . . . News · Statistics 1

Big contractors may corner building; Canadian aluminum invades Los Angeles; Aircraft forced to gear up slowly; Ultra boom in wood industries; Furniture flies to market

APPARENTLY neither heavy construction and residential building, which have contributed so much to the industrial economy of the West in the postwar period, will be impaired in the immediate future as a result of the mobilization situation. In fact, work on hydro-electric projects will be expedited, and there are too many people able and willing to buy new houses to affect the erection of dwellings. However, big building contractors are reported to be building up inventories of supplies of all kinds, and smaller operators may be frozen out later for lack of plumbing goods, pipe, etc.

Building permits for July in 266 leading Western cities and counties show an increase of 34.3% in number over a year ago, and a gain of 80.7% in value, according to *Western Building*. Incidentally, a far larger part of available industrial land in the San Francisco Bay area was sold for residential purposes than for industrial use, according to Robert P. Danielson, industrial planning consultant. This is due to the boom in low-cost housing, where site preparation expense must be kept to a minimum and the demand consequently has been for level land, the only land which most industries can use.

Six months totals for northern California show 78 new industrial plants and 180 expansions, totaling $35,239,870, a decrease of 19% from first half of 1949. Southern California reports 63 new industries and 209 expansions, totaling $39,152,750. Seattle's capital expenditures for first half of 1950 total $9,226,590.

Security-First National's index of business activity in southern California shows a 6.5% gain for the first half of 1950 over 1949; Wells Fargo rates California business activity for June as the highest since Aug. 1948. Seattle-First National describes the Pacific Northwest situation as "another uncertain wave of prosperity," and points

Continued on Page 29

Business Activity Indices

	April	May	June
[1]Arizona	336.5	338.0	355.1p
[2]California	226.5	233.5	234.1p
[3]So. California	278.3	286.6	.....
[4]Pacific N.W.	231.7	233.5	.....
[1]Puget Sound	225.6	228.2	.....
[4]Inland Empire	250.0	253.9	.....
[4]Lower Columbia	229.4	229.4	.....

1. Valley National Bank (Phoenix) index, based on a weighted composite of retail sales, agricultural income, and employment in mining, manufacturing and construction, seasonally adjusted. 1940 = 100.
2. Wells Fargo Bank & Union Trust Co. index based on the following components: Industrial production, freight carloadings, bank debits, department store sales (weighted 4, 3, 2, 1, respectively, and adjusted seasonably).
3. Security-First National Bank of Los Angeles index, based on the following components and weights, and adjusted seasonally: department store sales, 15; building permits, 5; Los Angeles bank debits, 20; residential city bank debits, 5; agricultural city bank debits, 5; industrial employment, 20; industrial power sales, 13; railroad freight volume, 6; telephones in use, 7; real estate activity, 4.
4. Index compiled by Bureau of Business Research, University of Washington. Basis of compilation not indicated.

p. Preliminary estimate.

FREIGHT

Cars of revenue freight, railroad carriers in 11 Western States

Compiled from Assn. of Am. R. R. weekly reports

	Carloadings		Received from Eastern Connections	
	1949	1950	1949	1950
June	544,318	550,918	273,065	300,450

TRUCK TRAFFIC

(Number of commercial trucks entering state through border checking stations)

	CALIFORNIA		ARIZONA	
	1949	1950	1949	1950
July	14,774	20,534	21,465	24,759

BANK LOANS

Industrial, commercial and agricultural
(In millions of dollars)

From weekly reporting member banks of Federal Reserve System in 7 Western cities: L.A., S.F., Portland, Seattle, Tacoma, Spokane and Salt Lake.

(Average of Wednesday reports)

June, 1949	2,003
June, 1950	1,892

BANK DEPOSITS

(In millions of dollars—adjusted)

Average of daily figures. All member banks in the 12th Fed. Res. District. Demand deposits, excluding U. S. Government deposits, cash items in process of collection, and interbank deposits.

	June 1949	June 1950
Net Demand Deposits	8,322	8,823
Time Deposits	6,136	6,289

WHOLESALERS' SALES

In thousands of dollars. Percentage changes are from corresponding month of preceding year. From Bureau of the Census.

MOUNTAIN

1950	Automotive Supplies	Change	Electrical Goods	Change	Furn. and house furn.	Change	Groc. and foods exc. farm. prod.	Change	General Hardware	Change
January	805	+ 9	2,691	0	.....	.....	.....	.....	966	—18
February	795	— 7	3,131	+ 6	804	+30	.....	.....	1,360	+ 1
March	643	—23	3,671	— 2	1,202	+49	.....	.....	2,138	+ 2
April	907	+10	3,288	— 3	907	+20	.....	.....	1,998	— 8
May	781	— 6	4,050	+ 9	1,045	+43	.....	.....	2,157	+14
June	857	+15	4,074	+ 1	1,294	+15	.....	.....	2,186	+ 7

PACIFIC

January	1,902	— 9	10,943	— 2	2,411	+19	.....	.....	5,345	—15
February	2,892	+ 5	12,276	+ 7	2,508	+15	.....	.....	5,775	— 8
March	2,320	— 2	14,254	+ 7	3,402	+27	.....	.....	7,371	— 2
April	1,437	—13	13,120	+ 3	3,124	+25	.....	.....	6,659	— 2
May	1,800	+ 9	14,510	+ 7	1,896	+39	.....	.....	7,953	+ 9
June	2,592	+ 3	15,062	+ 3	3,108	— 5	.....	.....	8,675	+ 7

CONSUMERS' PRICE INDEX

From Bureau of Labor Statistics
100 = 5 yr. Avg. 1935-39

1950	Los Angeles	San Francisco	Portland	Seattle	Denver
Jan.	15....166.9	.....	173.8	.....	.....
Feb.	15....166.1	.....	.....	171.6	.....
Mar.	15....165.9	172.3	.....	.....	.....
Apr.	15....166.9	.....	174.8	.....	165.7
May	15....166.7	.....	.....	171.8	.....
June	15....166.7	173.1	.....	.....	.....

Industrial Supplies	Change	Lumber and bldg. mat.	Change	Mch. equip. and supplies excl. elec.	Change
1,567	—13	1,893	+15	331	— 7
1,797	— 9	1,733	+27	397	0
2,397	+ 9	2,371	+19	682	+ 8
2,272	+16	1,602	+21	716	+ 1
542	+19	1,707	+47	534	—18
710	+ 5	1,942	+ 7	565	—23

INDEX NUMBERS OF WHOLESALE PRICES BY GROUPS OF COMMODITIES AND BY MONTHS

Bureau of Labor Statistics, Washington 25, D. C.
(1926 = 100)

1950	Farm Products	Foods	Hides and Leather Products	Textile Products	Fuel and Lighting	Metals and Metal Products	Building Materials	Chemicals and Allied Products	House Furnishing Goods	Miscellaneous	ALL COMMODITIES
January	155.3	154.7	179.3	138.5	131.3	168.4	191.7	115.7	144.8	110.0	151.6
February	159.1	156.9	179.0	138.2	131.2	168.6	192.7	115.3	145.0	110.0	152.7
March	159.4	155.5	179.6	137.3	131.4	168.4	193.9	116.3	145.3	110.7	152.6
April	159.3	155.3	179.4	136.4	131.2	168.7	194.8	117.1	145.8	112.6	152.9
May	164.7	159.9	181.0	136.1	132.1	169.8	198.1	116.4	146.6	114.7	155.9
June	165.9	162.1	182.6	138.6	132.7	171.8	202.2	114.5	147.0	114.8	157.3

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Millions of Western-Made Fasteners...

...for West Coast Industries

Our new, modern Los Angeles plant has been established for just one purpose . . . to give West Coast manufacturers better and faster service on their fastener needs.

A complete line of "National" standard fasteners is now available to Western industry through this well-equipped plant.

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National
PRODUCTS

Continued from page 27

out that bank debits for 333 U. S. cities for five months of this year was 5.8% above last year, while for 31 Coast cities the gain was only 2.3%.

Six classifications of wholesalers' sales in the Pacific states in May were above the corresponding level of May 1949, and only one below, while in the Mountain states three were on the plus side and only one below. A year ago seven groups in the Pacific states were below 1948 and none above, while in the Mountain states two were below and one above.

Oil

Even before war broke out in Korea it was evident how greatly the oil industry's soggy position of last year had improved. Dispatch of huge quantities of heavy Western fuel oils had brought down topheavy inventories to little more than half 1949's figure. Eastern markets have been busily rebuilding their stocks after drastic inroads made during last winter's coal strike.

Now the price of Western fuel oil has started upward. It advanced twice in July. The price of gasoline likewise has crept higher everywhere except in some coast sections where local price wars continue. Even without the Korean situation, however, experts were expecting California's gasoline inventories to reach their lowest point in a decade, or about half last year's level.

These factors, plus war demands, have lifted the price paid for crude oil at the well, and in response the industry has begun to reopen wells shut down because of poor market conditions. More than 4,000 wells producing heavy crude, and several new fields yielding light oils, had previously been pinched off in California alone.

Some 13,000 barrels in daily production now has been added by reopening of closed wells. At the same time, a drilling boom has started which may mean that 1950 will see more new wells drilled than in any year in U. S. history.

PETROLEUM

(California, Oregon, Washington, Arizona, Nevada)

(From Bureau of Mines)
(In Thousands of Barrels Daily)

	May 1949	May 1950
Crude Production	927	872
Gasoline	372	361
Gas, Oil and Diesel	126	125
Heavy Fuel Oil	584	286
ALL PRODUCTS	1,001	945

INDEX OF DEPARTMENT STORE SALES

(Index numbers, 1935-39 daily average = 100 with seasonal adjustment.)
Compiled by Federal Reserve Bank

	June 1949	June 1950
Total 12th Fed. Res. Dist.	335	342
Southern California	365	370
Northern California	309	312
Portland	328	324
Western Washington	343	364
Eastern Washington and northern Idaho	359	371
Utah and southern Idaho	312	330
Phoenix	402	442

It is too early to forecast effects of the war situation accurately, but experts who this spring figured U. S. requirements for petroleum products would run 5½% higher in 1950 than in 1949, now say the need will be 7% to 8% higher.

It is generally conceded that California's known oil structures could give another 150,000 barrels daily without extending themselves to the point of damage to the formations. This would add about 50,000 barrels a day of bunker fuel for ships and a like amount of motor fuel, plus other products.

Nationally, estimates the American Petroleum Institute, the industry could immediately step up U. S. production from the slightly less than 5,000,000 barrels daily being produced this spring, to a good 6,000,000 barrels a day.

Meanwhile the U. S. and British governments have clamped a lid on shipments of oil to the Far East. The Department of Commerce also has slapped controls on export of oil producing and refining equipment to Central and South American countries for fear such goods might be reshipped to Russian-dominated areas.

The United States, says the Bureau of Mines, produced about seven and a half times as much crude oil last year as did Russia.

Gas

First quarter sales of natural gas in the Pacific states reported by American Gas Association were up 2.0% above 1949, revenues increased 2.9% and total number of customers 6.1%. An increase of 44.8% in industrial sales offset decreases of 4.4% and 7.6% in residential and commercial sales. The gain in number of industrial customers was 558. Increase in number of domestic customers, which can be taken as an indication of population growth, was 131,305. Manufactured gas sales in the Pacific States were off 1.3% and revenues 16.1%, and number of customers declined 3.3%.

In the Mountain states, natural gas customers increased 11.9% over the comparative first quarter of 1949, sales were up 8.1% and revenues 7.0%. The only decrease suffered by natural gas in the area was the loss of 18 industrial customers, or 1.1%.

NATURAL GAS

CALIFORNIA

(Compiled by Roy M. Bauer, gas supply supervisor, Southern California Gas Company)

UTILIZATION

(in thousands of cubic feet)

Number of Consumers March	1950	1949
Domestic and Commercial	2,742,728	2,590,038
Industrial	6,386	5,766
First Quarter		
Domestic and Comm. Sales	105,723,386	110,680,275
Industrial Sales	26,748,916	20,788,118
Electric Generation	9,611,535	7,317,527
Net Receipts from Producers	143,291,317	143,554,813

Electric Energy

Greatest peak in power demand in northern and central California was served the last week in July by Pacific Gas & Electric, 2,519,000 kilowatts, an increase of 209,000 kilowatts over the 1949 record, established last year. It was 123% above the pre-war peak of 10 years ago, but P. G. & E. still had a margin of 476,000 kilowatts generating capacity (19%). The Pacific Northwest load for the first quarter was up 23% above a year ago, but there is surplus capacity available during the summer months. Next winter, however, may see a tight squeeze, particularly if the season is dry. Efforts are being made to expedite construction of the new hydro projects, in view of extra demands resulting from the war mobilization activities. Additional aluminum load is due next spring when Kaiser puts in an extra pot line at the Mead reduction works at Spokane, using equipment cannibalized from the unused war plant at Riverbank, Calif., and two or three years hence when Harvey Machine Co. builds a plant at Hungry Horse Dam.

Coal

Intermountain bituminous coal production took a seasonal jump during July. Commercial mines were generally operating four days per week (compared to two days in June) at the end of the month. Trend is expected to continue upward through the fall months.

Steel

Steel distributors and users have been loading up with everything available since the fateful day when the North Koreans invaded South Korea (Mr. Malik says it was the other way around), all the "cats and dogs" are being snapped up and the industry is back almost to war conditions, although there has been very little actual demand from the armed services as yet for steel or fabricated products. Inventories had been sharply liquidated last spring and fall. In the building field, where a pinch-off on residential construction might be expected, the big building contractors have been laying in supplies of plumbing goods and everything else needful. Heavy construction plans are also continuing to go ahead.

Columbia Steel announces plans to install additional cold reduced sheet and tin plate facilities at Pittsburg, Calif., to provide annual capacity of 215,000 net tons of sheets and tin plate. Installation is to be completed by late summer 1951.

At the Geneva mill in Utah, additional facilities for the production of 100,000 tons of hot rolled sheets annually will be installed in a new building to be erected. These proj-

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IRON AND STEEL

WESTERN AREA OF THE UNITED STATES

From American Iron and Steel Institute (in net tons)

	June 1949		June 1950	
	Output	Per Cent of Capacity	Output	Per Cent of Capacity
Pigiron Output	170,546	71.2	241,778	88.4
Steel Output	351,917	81.3	451,077	96.2
Alloy Steel Output	4,990		10,177	
Carbon Ingots, Hot Topped*	7,051		5,870	

*Included in total steel.

Have you heard about the *NEW* T5X?

Fortified with *new* compounds, the amazing purple oil now offers you greater engine protection than ever before!

Surpasses "Supplement 1" specifications

The amazing *purple* oil is now better than ever! With even greater alkaline reserve, oxidation resistance, detergency and other upgraded qualities, the *new* T5X surpasses the exacting standards of U. S. Army Specification 2-104B, *Supplement 1*.

Its superiority has been clearly established in both the Coordinating Research Council gasoline engine tests and the rugged "Caterpillar" Diesel tests.

Protects *any* internal combustion engine

Powerful *new* additives have been compounded with a high VI, pure 100% paraffin base to form the *new* T5X. And its improved quality is so high that this great oil is recommended for *any* internal combustion engine operating under severe conditions.

Proved under critical field conditions

Field tests made by outside companies under critical operating conditions have *also* proved the amazing stability and performance of the *new* T5X in all types of equipment —including trucks, tractors, construction equipment, marine engines and varied types of stationary engines.

Substantially reduces engine wear

What the new, unusually high quality of T5X means to *you* is the opportunity for increased engine efficiency, less wear and lower maintenance and repair costs. And you can prove this for yourself by giving the *new* T5X a trial in your *own* equipment operating under severe conditions.

For full information about the new T5X, call your Union Oil Representative. Or write, wire or call Sales Dept., Union Oil Company, Los Angeles 17, Calif.

76 UNION OIL COMPANY OF CALIFORNIA

Continued from page 29

ects by U. S. Steel subsidiaries do not displace plans for expansion of Columbia's facilities near Los Angeles.

Nonferrous Metals

Nonferrous metals production trend was upward during July but fell far short of keeping up with skyrocketing demand. Unfilled zinc orders equaled a full month's domestic shipments and copper was just as tight. Lead turned from a surplus to scarce situation because of protective buying.

Aluminum

The new foreign trade zone at Los Angeles is being tried as a local reservoir for imports of Canadian aluminum. An experimental shipload of 5,500 tons which went partly into storage at the port, pending marketing of the balance among California plants, may be the forerunner of important additional shipments.

Contrary to the normal pattern, aluminum sales already were heading upward early this summer when the Korean crisis broke, bringing heavy new demands on the industry. Already Henry Kaiser has announced he is expanding his reduction capacity at Tacoma and Spokane by 80,000,000 pounds a year. Reduction pots and rectifiers purchased from the government's Riverbank plant will get into production at Spokane by next March, and the Spokane rolling mill will be enlarged to increase annual finishing capacity by 72,000,000 pounds.

Lumber

The entire Western industry is experiencing a run-away boom in production and prices. Western Pine Association, with membership in much of the 11 Western states, at first large annual meeting in years, predicted no let up in present pace for balance of year. Housing restrictions spawned by Korean war have had little effect. Stocks are low in dealers' hands; there is much competition in buying. Lumbermen are certain that an all-out war would not only increase the demand for lumber, but change the nature of the customer.

Prices are still climbing and under any other conditions lumber would be pricing itself out of the market, but steel and other construction material shortages, and threatened shortages, make for willing purchasers at any price. Log prices are tending up and mills are making little progress in building up log inventories against next winter when some higher elevation logging shows are bound to be shut down even if there is a mild winter. Some mill shutdowns or slowdowns next winter for lack of logs is in prospect. Long drawn out strike against Weyerhaeuser Timber Co., largest of the Pacific Northwest producers, has been ended, and this needed volume is now again available.

Plywood

All mills are running full capacity and order files are booked solid as far as 120 days ahead. Price quotations on future deliveries are as of date of shipment. Prices are still tending up, now running $92-$95 per M sq. ft. ¼-inch basis as against about $88 month ago. Buyers are combing the Coast in droves. Industrial buying is particularly heavy. There is some fear of government controls; said controls would have little effect on volume of production but would divert plywood to different channels.

A few cancellations have been reported in door industry, stemming to prospective war uncertainties, but these cancellations are coming only from the conservatives while the man with an eye for the fast buck is making hay. The boom is seriously lowering morale in the whole field of distribution. Barter conditions are developing where distressed buyers attempt to intervene as buyers of logs in order to get finished product on a trade basis. Log prices are climbing and few are going into stockpiles against next winter's needs.

SOFT PLYWOOD

From Bureau of the Census

PRODUCTION

(in thousands of square feet)

	1949	1950
May	164,185	228,278

PULPWOOD

(Pacific Northwest)

(Cords of 128 cu. ft., roughwood basis. Source: Bureau of Census)

	May 1949	May 1950
Receipts	316,352	280,258
Consumption	255,563	318,904

CALIFORNIA REDWOOD ASSOCIATION

(Thousands of board feet)

	May 1950 All Species	May 1949 All Species
Production	58,624	44,395
Shipments	50,943	34,582
Orders Received	48,715	30,404
	June 1950	**June 1949**
Production	58,015	44,771
Shipments	55,239	34,963
Orders Received	52,671	30,673

WEST COAST LUMBERMEN'S ASSOCIATION

(Thousands of board feet)

	July Aver. Per Wk. 1950	1950 M Feet 30 Weeks	1949 M Feet 30 Weeks
Production	184,871	5,775,026	5,500,481
% 1945-1949 Yrs.	112.7%	117.3%	111.7%
Orders	207,661	6,550,896	5,469,824
Shipments	176,977	6,080,425	5,436,415

WESTERN PINE ASSOCIATION

(Comparative report, 91 identical mills, in thousands of board feet)

	Week Ending Aug. 5	Three Year Weekly Avge. for Aug.	Total to Date 1950	Total to Date 1949
Orders	74,672	66,232	2,217,425	1,801,842
Shipments	81,088	69,929	2,118,827	1,769,358
Production	81,277	71,861	1,804,434	1,671,600

Pulp and Paper

Ultra boom conditions prevail. Production is on a 7-day week basis 'round the clock. Everything is pointing up and farther up—production, prices, cost of supplies and equipment. Paper prices are up, stock market quotations are up. Prices on pulp have advanced substantially again and there is no prospect of a setback. An all-out war would mean restrictions on domestic uses while much production would be diverted to pulp used for manufacturing military explosives.

Announcement has been made that Pacific Mills Ltd. and Canadian-Western will jointly build a new 300-ton newsprint mill on Vancouver Island in British Columbia in Campbell River district. All mills are very actively buying equipment and supplies. Special metals such as nickel, used in pulp mill valves and fittings, in short supply and consequently some equipment harder to get. Threat of priorities is getting bigger.

Aircraft

The aircraft industry, now geared to producing for a 48-group air force, will find the speed-up to a 69-group pace a tougher job than the immense upsurge demanded by the production goals set up after Pearl Harbor. For example:

1. The U. S. was turning out about 2,461 planes a month at the time the Japanese struck, whereas today it is producing about one-tenth as many, or about 205 a month. We are losing about 215 per month in Korea, or more than we are building. To reach the War II peak would take about three years.

2. The number of aircraft workers in Los Angeles in June was about 58,000 as compared with 237,493 at the war peak, and a large share of these once working have lost their skills, or would not be available again.

3. The industry had stabilized its output at a rate sufficient to keep level for a backlog scheduled over the next two years. It must now create many new assembly lines.

4. Modern planes are twice as heavy as the 1942 models, require four times as many man-hours of labor, cost four times as much and contain many electronic gadgets and other equipment requiring highly specialized skills to produce.

On the other hand:

1. The military is blessed with the fruit of intensive mobilization planning, plus perhaps three billion dollars' worth of plants and machine tools from the last war. Stockpiles of critical material are available, as well as a wealth of know-how accumulated in World War II.

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AIR FREIGHT

(In pounds. Figures from airports)

1950	Los Angeles In	Los Angeles Out	San Francisco In	San Francisco Out	Oakland In	Oakland Out	Portland In	Portland Out	Seattle In	Seattle Out
January	1,139,500	1,064,212	855,863	929,761	210,615	158,460	.....	.....	392,850	621,221
February	1,027,146	1,086,299	814,706	1,179,674	107,182	158,467	.....	.....	.....	.....
March	1,235,068	1,330,344	1,012,229	1,245,260	137,671	253,652	.....	.....	.....	.....
April	1,142,800	1,326,717	920,288	1,258,831	122,080	208,185	.....	.....	522,339	1,102,309
May	1,250,339	1,579,975	1,219,400	1,525,760	109,456	254,611	.....	.....	487,571	1,114,512
June	1,224,869	1,366,397	953,725	1,417,725	75,187	172,046	.....	.....	.....	.....

WHITE has done something about MORE PAYLOAD

The *Sensational* NEW WHITE 3000 TRACTOR

MORE PAYLOAD ON BOTH AXLES

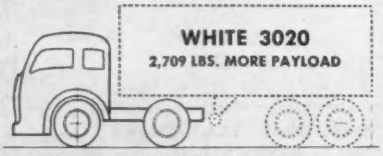
The design of White's new 3000 tractor permits additional revenue on every trip because new scientific weight distribution, explained below, adds from 2,000 to 3,000 lbs. payload on single axle trailer or tandem, depending on state laws.

PLUS all these other White 3000 Extra Earning Power Advantages for Highway Transport Service

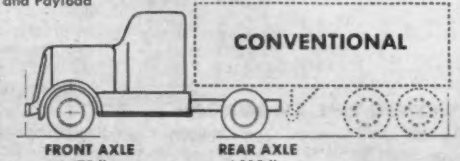
- ★ **IMPROVED** roadability... safer on the highway
- ★ **BIG,** roomy cab with new driver comfort features
- ★ **FINEST RIDING**... best maneuvering
- ★ **POWER-LIFT CAB** cuts maintenance costs in half
- ★ **LASTS LONGER**... lower depreciation cost
- ★ **SMART,** new functional styling
- ★ **WHITE SUPER POWER QUALITY** ..."First choice of the Pros" year after year

HERE'S HOW THE WHITE 3000 WEIGHT DISTRIBUTION ADDS TO PAYLOAD

New scientific weight distribution of the White 3000 tractor makes possible more payload on both front and rear axles. The shift of weight to the heavier, rugged front axle in the 3000 puts 65% of the weight of chassis and cab before body and payload on the front axle. This leaves 35% of the weight on the rear axle. On the conventional tractor, 55% is on the front... 45% on the rear.



	FRONT AXLE	REAR AXLE	
White 3020 Tractor	5,481 lbs.	3,400 lbs.	
Axle Capacity	10,000 lbs.	18,000 lbs.	TOTAL PAYLOAD
Possible for Body and Payload	4,519 lbs.	14,600 lbs.	19,119 lbs.



	FRONT AXLE	REAR AXLE	
Conventional Tractor	4,475 lbs.	4,115 lbs.	
Axle Capacity	7,000 lbs.	18,000 lbs.	TOTAL PAYLOAD
Possible for Body and Payload	2,525 lbs.	13,885 lbs.	16,410 lbs.

PERMITS ADDITIONAL PAYLOAD OF 2,709 LBS., WITHIN THE 18,000 LB. STATE HIGHWAY LIMITATION

Coast-to-coast owners of White's sensational 3000 model have *substantiated* every claim made for this model's economy... faster delivery time... at higher payloads. Your White Representative will gladly show you how it can be profitably applied to your business.

THE WHITE MOTOR COMPANY

CLEVELAND 1, OHIO, U. S. A.

Pacific Coast Branches and Dealers in all important cities.

White SUPER POWER 3000 **Tips its Cab to Service**

FOR MORE THAN 50 YEARS THE GREATEST NAME IN TRUCKS

Continued from page 31

2. The existing labor force is a nucleus of seasoned workers well fitted to lead a training program. The industry could not use vast numbers of new people immediately, and the tooling-up that must come before they could begin proucing at capacity gives time for gradual building of skills.

3. The industry is actually using more manufacturing space than it did during the war—about 14 billion square feet now as against 12 billion in 1944. New plant construction won't be much of a problem.

In issuing "letters of intent" covering four to five billion dollars' worth of work, the Air Force hopes to spur the industry to a considerably higher output without committing manufacturers to a "boom" expansion that might cause financial disaster should the threat of general war suddenly be dispelled. It is estimated that present production could be trebled to about 645 a month in July, 1951; trebled again by July, 1952; and boosted to 500 monthly by July, 1953. During World War II, a peak was reached at 9,100 a month.

The thousands of job seekers who rushed to Western aircraft plants when they heard of the new contracts found employers ready to hire only the key skills needed in tooling up for the big job ahead. For the unskilled or even the semi-skilled there were few openings; what was wanted were machinists, engineers, tool and die makers, jig builders, sheet metal and machine shop layout men, experimental mechanics, tool grinders and tool designers. By next summer, however, total U. S. aircraft employment may exceed 500,000, or double what it is now.

Naturally the industry's first move is to add shifts wherever possible. Lockheed, whose 15,000 people have been working on two shifts, will put on a third shift. Consolidated-Vultee at San Diego established a ten-hour day for half its 8,000 employees now working on modernizing the B-36, in order to coordinate with Convair's delivery schedule from its Fort Worth plant. Douglas has begun hiring 2,500 people for reconditioning of B-26 bombers and conversion of transport ships. Boeing at Seattle is preparing for expansion of its B-47 jet bomber and C-97 jet transport schedule and has promptly subcontracted to Ryan at San Diego more than $10,000,000 worth of work on aft fuselage sections for the big transport crafts. Solar at San Diego received a flood of orders for engine parts that will put it on a three-shift, six-day-week schedule. North American is hiring about 50 people a day for work on the F-86 and F-95 jets and the T-28 trainer.

Out of the mothballs meanwhile are coming World War II planes that will be a bonanza during the period when we are losing planes faster than we are producing them. Grand Central Aircraft of Glendale already had taken on a $13,000,000 job of modifying B-29's and F-51's for the Air Force's foreign arms aid program, planning to do it at Tucson. Like Pacific Airmotive, it is looking for several hundred "E" license engine mechanics.

Curtiss-Wright is getting $6,000,000 worth of B-29 reconditioning work, Slick Airways will be paid more than $1,000,000 for handling C-46 transports, and Texas Engineering and Manufacturing will receive $7,000,000 worth of reconditioning C-54 and C-97 transports and F-51 Mustang fighters. In all, perhaps 10,000 planes may be taken out of mothballs.

Canning and Packing

As might be expected, the mobilization situation changed the canning picture over night from a question of how the pack will be sold to the less annoying one of how far the pack will go toward supplying the demand, which may mean even inability to fill government orders in their entirety. No one thought of consulting Joe Stalin when the decision was made by growers and canners jointly last spring to trim the California cling peach pack down to expected requirements by thinning the crop on the trees by 15%, but it's too late now. Growers set the price of clings to canners at $60 a ton, compared to $40 last year. Proportion of apricots going to dry yards is expected to be lighter this year than usual, because of heavy demands from canners and because juice packers are reported taking the off-sizes usually going to the dryer. Hawaiian Pineapple Co. have increased their acreage about 13%, by purchase of 17,300 acres of land. of which 5,000 acres are suitable for pineapple growing.

California tomato acreage is estimated at 78,000, as aginst 75,000 last year, when the yield was 13.3 tons to the acre. California canned asparagus pack totaled 2,539,542 cases; 1949 count was 2,630,756 cases; freezers took 5,907,744 pounds, as against 2,852,364 pounds in 1949. California winter frozen vegetable pack totaled 70,253,992 pounds; 1949 figure was 63,813,737 pounds; big jump in broccoli from 10 million pounds to nearly 23 million offsetting decreases in broccoli, cauliflower and spinach. Quick-frozen foods moving out faster than ever before.

Purchase by California Fruit Growers Exchange (through its subsidiary, Exchange Lemon Products Co. of Corona) of Damarel-Allison citrus processing plant in Covina for more than $1 million following doubling of orange processing facilities indicates that the Sunkist organization has at last decided to go in for processed juice on a major scale, after having endeavored for some years to stem the tide flowing in that direction. Purchase gives a combined capacity of the two lemon processing operations at Corona and Covina of 600 tons of lemons daily. Damarel-Allison fresh orange juice volume of 7,500 gallons daily will continue, also processed peel, but the plant will be used mainly for frozen lemon concentrate.

General overall outlook for 1950 salmon pack is poor as to volume, good as to price. There is no visible carry-over of last year's pack. Domestic market is easily absorbing practically all production and packers are quite disinterested in export where dollar difficulties and other problems are encountered. Prices have gone up sharply in past three-four months; for example, grades selling about $14.75 per case are now fetching $22-$24. No softening of prices in sight.

On the catching end, Bristol Bay red area was poor like last year, Prince William Sound district was a failure, Southeastern Alaska, which runs heavier to the cheaper non-red fish, has not started fishing yet but is not looking forward to anything approaching last year's phenomenal run. The rehabilitated Fraser River run of Canada, fished by both Canadian and American interests, is expected to be good. Labor troubles are fairly well ironed out by now.

Tuna packing will be heavy this year, with Northwest tuna packers having their best year since 1944 and southern California expecting to pass its all-time high of last year.

Furniture

Upsurge in consumer buying has stimulated activities of western furniture manufacturers, but the impetus has not become sensational. Heaviest impact is felt in home appliances, with case goods next and chrome furniture not far behind.

Some stove manufacturers have experienced a great influx of orders and some makes are on allocation to dealers.

The furniture trade generally is restocking heavily against expected advances in prices, which so far have jumped five to seven per cent since the Korean affair began.

Production costs have been boosted somewhat by raw material price increases, with Philippine mahogany up about 15% and a further advance expected. Fabric cost increases also have been felt by upholsterers.

The Furniture Manufacturers Association of Southern California has formed an air-freight shipping pool for expedited shipments of its 110 member manufacturers to Chicago and New York by Flying Tiger line which will save shippers as much as 40 per cent. Most shippers previously paid a rate of $19.61 per 100 pounds to New York. Now they will pay $12.50. The former Los Angeles-Chicago rate of $14.20 per 100 pounds will be reduced to $9.00. In many cases these rates will be less than rail LCL because crating will be unnecessary.

Sugar

Continued building up of inventories by the trade has required California & Hawaiian Sugar Refining Co. to run six-day weeks in July and August at its big Crockett refinery. There have been quickie strikes in the Hawaiian Islands, but not enough to cause any loss in production. The trend to installing packaging equipment by smaller beet refineries is still in evidence, but invasion of the packaged sugar field has its drawbacks, because of the difficulty of making a profit on small volume in some of the items, such as powdered sugar.

Meat

Since the Western States Meat Packers Association convention in San Francisco in February there has been some response to the call to develop by-products. Laboratories in the San Francisco Bay and Southern California areas have begun investigating the possibility of extracting insulin from pituitary glands of hogs. Otherwise, packers in the West still face competition from Kansas City meat in California, and Canadian beef in the Pacific Northwest, while the hide market continues dull because of the increasing use of synthetics for shoe soles instead of leather. Sheep population in the West is down to the lowest point in history, with lack of sheepherders on one side and losses to flocks from wild dogs and coyotes on the other.

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Key to Cutting Production Time: Materials Handling Flow

By EDWARD A. REPS
Southern Counties Gas Co.
Los Angeles

WHEN the population and industrial influx in Southern California forced us to consolidate all our meter and regulator test and repair activities at one location, we found that we had on our hands another problem that was fully as important as that of test and repair.

Like many typical Western plants, what started as a "corner-of-the-shop" job blossomed into a full-blown plant layout: still the same fundamental operations, but on a magnified scale.

We had been maintaining these activities at eight different locations in the Southern California area, and decided to merge them all into a single shop under one roof, in East Los Angeles.

We took stock of our organization plan, our work loads, our work simplification possibilities, our materials handling phases, to determine how they could be integrated and accomplished at less expense to the company.

A Revelation

We soon came to recognize that a major part of our enterprise became a materials handling project in itself, since handling and transporting units about the shop is as much a part of the cost of repairing and testing as the actual repair and testing activities themselves.

Repair and maintenance of meters and regulators is not a mere instance of "listening to the buzz inside" and then "de-buzzing" the unit. It's more than that.

If a genuine and sincere job of it is done, the meters and regulators must be completely disassembled into component parts, and each part worked over and tested. Then the unit is reassembled and tested again.

When any shop undertakes such an activity, particularly when their daily incoming and outgoing production looks like that of a manufacturing plant rather than a repair station, the repair station complexion completely changes.

Much thought and planning went into our decisions. Here is what we did and how we planned our new shop.

First, an overall analysis of our materials handling phase revealed that transport or movement of these units accounted for one-fifth of the time that repair or testing took, the way we were then doing the job.

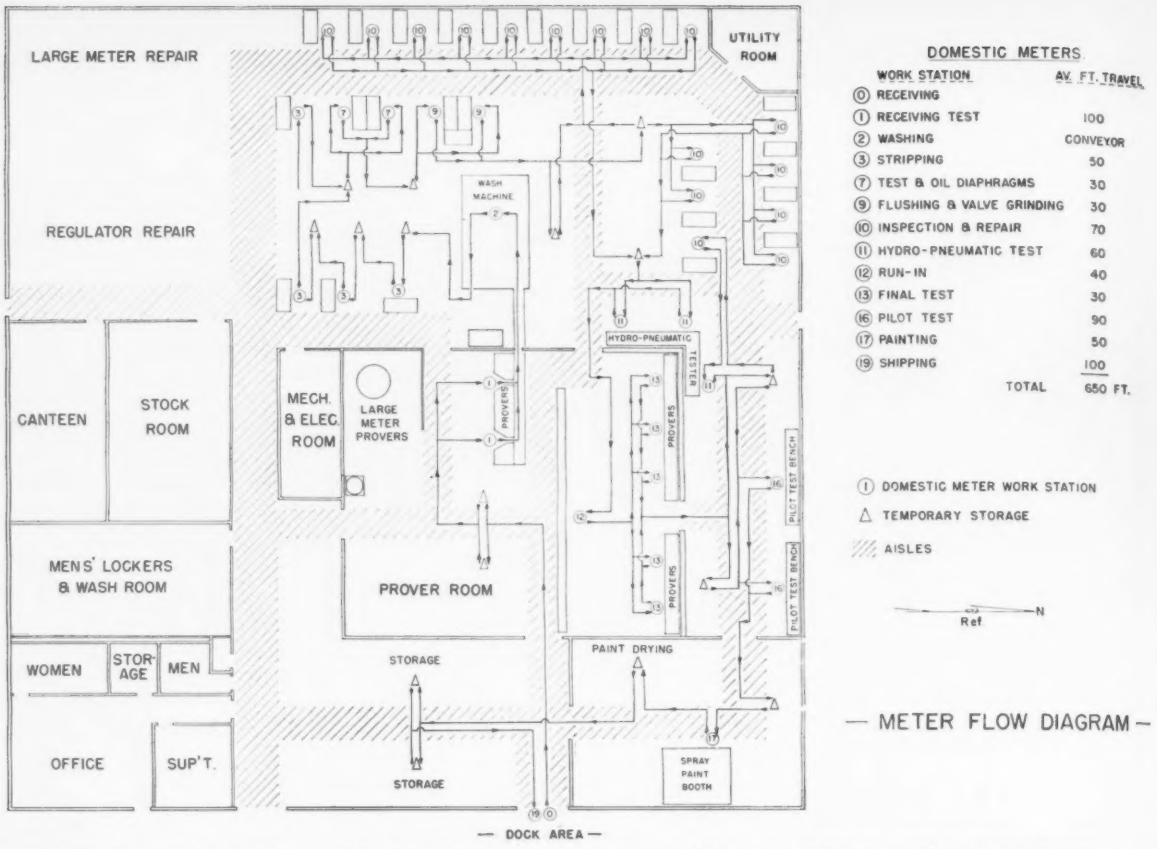
Transport and handling of meters and regulators in the shop was classified into three categories:

1. Handling at work stations.
2. Handling between work stations.
3. Handling at storage areas.

Handling Meters at Work Stations

It was estimated that domestic meters were handled at the work stations approximately 45 times during the processing through the shop. An average of 0.2 minutes per handling, the total time spent for 50,000 meters

When materials handling becomes the tail that starts wagging your plant operation dog, it's time to get a bigger dog —one with a shorter tail.



This plant was designed around the flow of meters, as they progressed from one station to another. Space and time are now used more efficiently, with resulting increase in production and decrease in operations.

per year would be 7,500 man hours. Two approaches were possible to decrease such physical handling at the work stations.

The first approach considered was to provide mechanical means of conveying meters through work stations so that the operations could be performed on the meter while it rested on the conveyor. This method, however, is dependent upon a constant flow of work through a work station, and a conveying medium applicable to all types of meters.

The following types of conveyors were considered for possible use in the new shop:

Slide Table
Gravity Chute
Gravity Roller
Gravity Skate Wheel
Live Roller
Overhead Chain
Fabric Belt
Steel Belt
Wire Mesh Belt

The various uneven bottom contours and the small bearing surfaces of the different makes of meters precluded the use of all of the conveyors except the overhead chain and the belt types.

It was found that the daily volume of each category of meter to be processed through the shop was not large enough nor was the volume consistent. The use of conveyors was therefore limited to work stations, such as washing and cleaning, where the same operations were performed on all the meters.

EDWARD A. REPS
Southern Counties Gas Co.

In the new shop, the overhead chain conveyor was adapted for the washing machine and a fabric belt conveyor with a slider metal bed was planned for transporting meters between the prover room and the cleaning station.

The second and more applicable method of decreasing physical handling at the work stations was to consolidate some of the operations and perform them on the meter while it rested on the equipment, work bench, or the special meter hand truck.

It was possible in this manner, to decrease the meter handling at the work stations from 45 to approximately 30 times during the processing through the shop. The labor involved in this phase of the processing could thus be reduced from 7,500 to approximately 5,000 man hours for 50,000 meters.

Handling Meters Between Work Stations

In laying out the flow of work through the shop, it was found that the most efficient processing would require a meter to travel approximately

One view inside the new plant, showing storage area in foreground. Meters are now moved en masse in orderly units as shown, and easily stored until needed. Clean aisles and uncluttered working areas result.

650 feet between the work stations through which it was processed. Including the return trip of the operator, the total travel distance in moving meters between work stations would be 1,300 feet.

Three methods of transporting meters between work stations were possible. They could be carried individually, moved on hand trucks or on skids, or transported on a mechanical conveying system between work stations.

If meters were carried individually, the total travel time for moving 50,000 meters per year, at a travel rate of 0.01 minutes per foot, would be approximately 11,000 man-hours. If meters were moved in truck or platform skid loads, at an average load of 22 meters, the total travel time for moving 50,000 meters per year would be approximately 500 man-hours.

After eliminating individual transport of meters, it can be seen that unless the reduction of travel time between work stations would be part of a program to eliminate handling at the work stations, as discussed previously, the addition of expensive conveying equipment would not be economically feasible.

It was decided, therefore, that meters and regulators would be moved in job lots on hand trucks, platform skids, or skid boxes between most work stations. Special hand trucks are used between work stations where work is done on the meter while it remains on the hand truck. Each truck holds a maximum of 28 tin or iron domestic meters. Between other work stations, domestic meters are moved on platform skids.

Each skid holds a maximum of 72 tin meters or 90 iron meters. Medium and large size meters are moved on individual platform skids, and the meters remain on the same skid during most of the processing. House type regulators are moved in skid boxes, each box holding approximately 80 regulators.

These skid boxes are also used to ship new, repaired, and unrepaired regulators between the General Meter Shop and the Divisions of the plant.

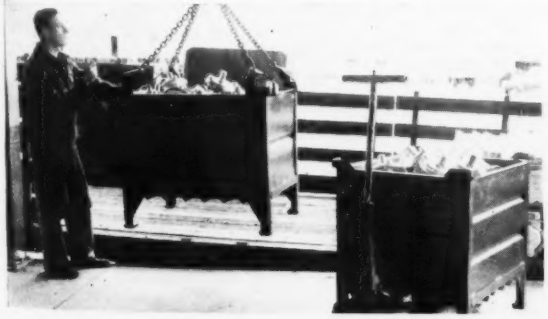
In order to permit continuous production at each work station, it was necessary to provide a bank of meters preceding each work station and thus equalize the varying rates of production.

Handling Meters at Storage Areas

If meters were stored on the floor at each bank, it would be necessary to unload and load each meter at these temporary storage areas approximately 22 times during the processing through the shop. This handling time for 50,000 meters per year, at 0.2 minutes per handling, would be 3,666 man-hours.

To eliminate this handling, it was planned to leave the meters or regulators on trucks and platform skids or on skid boxes in the temporary storage areas. These trucks or skids would then be moved to the work stations as required. Such mobile storage would justify the additional hand trucks, platforms, and storage spaces required.

Why use muscles when power is so much cheaper and faster? Every handling eliminated means costs cut.



This testing operation is set up on a production line basis, and lost time and motion are kept at a minimum.

GREASE:

There's More to It Than Meets the Bearing

And too much of it, or the wrong kind, or not enough can shut down your plant or wreck your machinery.

By M. M. PATTERSON
Sales Engineer
Master Lubricants Co.
Los Angeles

"YOU HAVE to know where it hurts before you put on the salve." That statement applies precisely to the problem of reducing high maintenance and replacement costs.

It is not until after your machinery has been purchased and placed in operation that your problems develop. And then they may become exceedingly costly.

For example, bearing failure is too often blamed on faulty machine design, faulty bearing construction or faulty materials. More often than not, lubrication failure is the cause.

This does not mean that the lubricant was not good: chances are that it was either the wrong lubricant for that job or the lubrication maintenance was neglected.

It is fully possible that the lubricant might be wrongly blamed, when maintenance alone is responsible.

Lubrication failures can be generally classified into one of three categories: (1) under-lubricating, (2) over-lubricating, (3) use of the wrong lubricating material. Here are some examples in industry:

Over-Lubrication

A food processor recently sent us a vigorous complaint that "grease is melting, dropping down, and ruining batches of food." We knew that the grease our engineer had recommended was one of the highest melting point products on the market, and we could not understand this complaint. Particularly so, since there wasn't any unusually high temperature problem in this application.

Accordingly, this engineer took another trip out to the plant—and sure enough, grease was escaping from the housing. Examination disclosed that the dripping grease was not deteriorated, and had never melted.

A little questioning of the machine operator revealed that he had established a routine practice of greasing the bearing every week-end, when actually once every five or six months would have been ample. Every time he put in a new supply of grease, it forced out the old. There was the cause of our complaint.

Here is another example of over-packed bearing housings — this time the distress call came from a cement mill near Bakersfield. The superintendent needed help and needed it right away. Every motor in his mill was running hot, and he was badly worried.

Our lubrication engineer who talked to him on the telephone suggested that it might be a case of over-lubricated bearings. "Too much grease in a closed fluid housing can cause friction and build up the bearing temperature," he explained, but the superintendent felt certain that that was not the case. Our engineer decided to go out and see for himself.

When he arrived on the scene, he was taken to a motor that was running so hot you couldn't lay your hand on it. He removed the grease plug, put a thermometer in the housing, and noted a reading of 230° F., dangerously high.

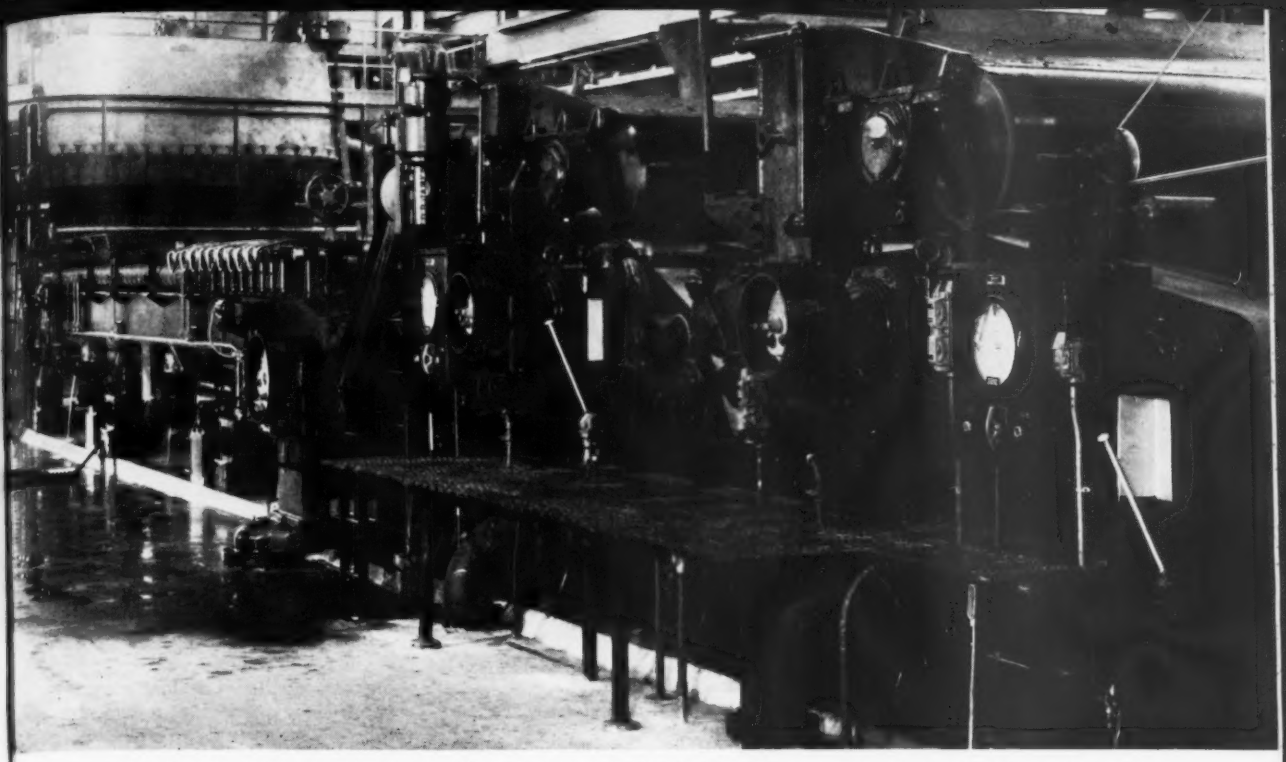
When filled full, the housing on that motor would hold about a cup and a half of grease; proper amount in such a housing would be about half a cup.

Still proceeding on the notion that this housing was over-packed, the engineer then opened the pressure relief drain plug in the bottom of the housing and let a full cup of grease drain off. By so doing he removed twice the amount of grease that should have been in there in the first place.

Within ten minutes the motor temperature had dropped 50° to 180° F. Right then, the relieved superintendent ordered all of the motors treated in a similar manner, and the trouble was eliminated.

Under-Lubrication

Usually, the situation is reversed from these cases. But either too much



One bearing failure in this paper-making machine would shut down the entire plant for at least half a day. Here's where plant lubrication maintenance of the proper sort really pays off.

or too little is bound to cause trouble, no matter how fine the lubricant.

A large textile finishing plant in Los Angeles, for instance, has a tremendous number of motors in operation. All of those electric motors use the same type of grease, but some operate on a 24-hours a day basis while others are in use only a fraction of that time.

The superintendent had set up his lubrication cycles on a uniform schedule for all motors, and when the motors getting the heaviest duty started to break down he thought nothing of it. He just put it down to the hard work those motors were performing.

He was right, of course—to an extent. But when a lubrication engineer recommended that he shorten the cycle of greasing on those motors his breakdowns dropped to almost one-third of the previous number.

Wrong Lubricant

Case histories related so far have been of instances of poor (or misguided) lubrication maintenance. Quite as often we find that it is a case of poor selection of lubricant.

Gone are the days when an average factory can lubricate everything out of the same barrel of lubricant. If you are doing that, it means that (1) either you are in an unusual situation where all of your machines have the same lubrication requirements or (2) you are not giving all of your equipment the lubrication attention and protection that it deserves.

No responsible grease manufacturer will tell you that their one product will do your job.

A dramatic instance of one of these lubrication bugs getting the "heave-ho" occurred several years ago in Los Angeles. One of our sales engineers had called on a new prospect, and to put across his point he offered to tackle the plant's most difficult lubrication problem. He walked into that one.

This particular firm made a business of processing waste materials and salvaging parts of it. And the problem they dropped on our engineer had plagued them for years. So long, in fact, that they had accepted the fact that they couldn't find an answer to their trouble.

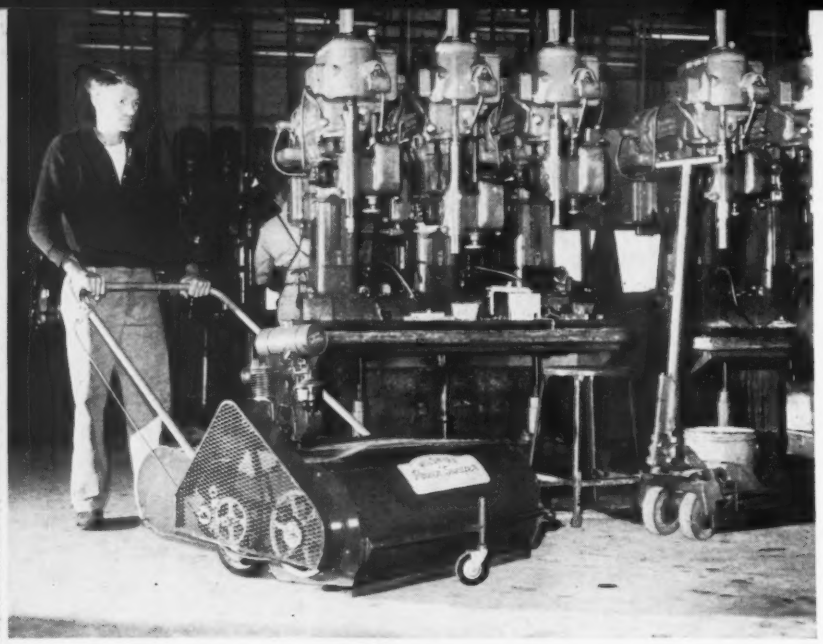
This was their difficulty: In their operation they had one division that salvaged tin cans. The cans were first put through a machine called a shredder, which machine consisted mainly of a huge drum weighing in the neighborhood of 3,000 pounds. This drum was covered by a series of blades, and the whole unit revolved at 1,500 r.p.m.

Cans were fed into it by a conveyor, and as they passed through the blades they were torn to bits. Immense weight of the drum plus the speed of operation put a severe load on the plain babbit sleeve bearings.

For lubrication, the manufacturer of that machine had supplied oil cups into which the user had found it necessary to pour high grade SAE 30 motor oil about every 15 minutes.

That job was delegated to one man,

This motor, mentioned in the article, was running hot. Bearing temperature was lowered immediately by simply removing overload of grease.



Two lube problems solved by grease. Sweeper had to seal out dust, seal in the lubricant. Drill presses required high-speed drip-free lube.

who had little time to do anything else. Even then, the bearing broke down about every 15 days. And that closed down the whole division until it was replaced. Replacement was no small job, and it was highly expensive.

Our engineer studied the problem for a day and then he made this recommendation: Attach an automatic force feed lubricator to the bearing housing and lubricate it with a fluid grease.

He was so sure of his solution that he purchased the applicator himself on the open market, and he told the plant superintendent that if it didn't work, it wouldn't cost them a dime. At about $50 apiece for applicators of that type, the engineer's statement was a convincing one.

Installation took half a day, during which time a new bearing was also installed in order to give the grease a fair start.

For two weeks the engineer held his breath. When the time came for the bearing to burn out on schedule, he stayed at the plant all day long. For a week he either called the plant or personally inspected his pet project. But he needn't have worried.

That bearing and the machine operated for nine continuous months without a failure.

Savings were great. A man was released for other duties. Lubrication costs were less. Bearing replacements were practically eliminated. Shutdowns were scheduled to conform with slack periods in production. Total cost? Only about $50 for the applicator.

Obviously, an electric motor installed in a room with temperatures up to only around 95° around it will require a different grease than a needle bearing in a high speed spindle generating temperatures up to 250° F.

Even two identical pieces of equipment may require different greases if they are located in positions where they have different exterior surroundings.

Important Variables

The important variables that determine what grease you should use are (1) speed, or r.p.m., (2) the high and low temperature range, (3) atmospheric conditions (aciduous, wet, or dry, etc.) and (4) size and type of bearing and housing.

These same variables are important factors in setting up lubrication cycles. We often hear the question "How often should I add grease to my equipment?" That one is always a question without an answer until we know the conditions under which the equipment is operating.

We have shown how heavy duty uses require more frequent greasing than light duty operations. The same is true of equipment that is subjected to dust which can contaminate the grease.

Grease subjected to moisture should be changed more often than a similar application in a dry atmosphere. Machinery that has lain idle for a long period of time should have the grease flushed from its bearings and new grease applied before the machinery is put into operation.

There is just one fundamental to remember about grease. It is a storehouse for oil. It is simply a means of holding oil near a bearing so that the oil can lubricate the high speed surfaces.

Good anti-friction bearing greases are free of non-lubricating fillers. These greases give protection even after the oil is all gone, since the base itself has some lubricating value.

In short, it is the oil in the grease that lubricates. As the bearing calls for more oil, the grease releases it for use. When the oil is gone, or when the oil content has run low, then the bearing is in danger.

All grease will "wear out." Good greases last longer than poor ones, and good greases provide for longer lubrication cycles and greater protection.

It wasn't many years ago that finding a better bearing was regarded as the only solution when a new machine required bearing applications of extraordinarily heavy duty. Designers and engineers now know that most bearings are capable of performing far beyond their present requirements *if they are properly lubricated.*

It is true that the life of a bearing is to a great extent dependent upon the life and quality of the lubricant. Manufacturers of sealed equipment who advertise "lubricated for the life of the bearing" often fail to explain that the bearing's life could be considerably lengthened if additional lubrication could be added.

Most current machine design research is directed toward the replacement of oil by grease anti-friction bearing lubrication. Industry has probably never before so completely overlooked such an important advance in materials and methods as the development taking place in the field of grease lubricants.

A Grease For Every Use

There is literally a specific grease for every standard industrial use today. The operating engineer who is not taking advantage of the proper greases for his particular equipment and operating conditions is inviting breakdowns, spoilages, and unnecessary expenses in many departments.

American bearing manufacturers are providing industry with the finest ball and roller bearings the world has ever seen. American production equipment is also unsurpassed. Considering that you have selected the right equipment for your requirements, the successful and efficient operation of that machinery is up to you.

If your maintenance cost and replacement rate seems unusually high, the first place to look is in your own plant, and the first thing to check is your lubrication practices.

Contract Deadline Trimmed by *simple jigs and fixtures*

Shop-made tools convert plant equipment into tailored production facilities. They made up for lost time, did the job right.

WINNER of the contract to build the railing for Grand Coulee Dam crest found themselves in a bit of a spot. They had a 180-day deadline, with the job to be completed by May 15. But the first shipment of material did not arrive until February 1.

In order to beat the deadline they had to convert existing machines in a hurry, since they did not have time to order and get delivery on new ones. Ingenuity cropped up, many simple but effective jigs and fixtures were made, and the job was virtually completed by May. This is how it was done.

Airfoil-shaped aluminum extrusions for the horizontal intermediate rails and half-moon shaped aluminum extrusions for the top rails and their component sash frames were purchased in California and brought to the plant by rail. They were cut to size on a shop-made cutter with special blades made by the Simonds Saw Co. This readapted war-made cutting machine was capable of greater speeds than the regular commercial cut-off saws. The extruded sections were brought to the machine on roller conveyor, pushed against the stop and clamped in a simple holding jig while being cut.

About Cost

The shop-made cutter cost less than $100 to make, excluding the 7½-hp. motor attached to the drive belt which turns the cutter. When the cutter head was brought down, an air nozzle and an oil line nozzle hit a contact stop which automatically sprayed air and oil (wool oil) onto the cutting blade while the blade was in motion. This saved an untold number of hours for the quantity cutting of the pieces over hand-brushing oil on the blade. The coolant oil was kept in a tank on the same table with the cutter.

Intermediate railing raw extrusions cut in this circular saw were all 2 inches in cross-section, with minimum thickness of 3/16 inches and maximum ½ inches. They were furnished in three sizes with widths 5, 5½ and 6 inches, and lengths 10.85, 10.75 and 10.68 feet on centers. The railing was to be fastened on one end only to the posts to allow for expansion, so the one hole was drilled in the end of each cut off section in a drill press.

A drill fixture consisting of 2 plates with the oval shape of the rails cut out in them, with a stop in the middle, held the section in place. The sections could be quickly fed into the oval holes and the drilling done. The railing was held to the posts by dog point screws, and all rails were marked according to the distance of the centers, for erection purposes at the dam.

On the same machine the aluminum open extrusion top rail, 10 inches wide at the base and 6½ inches high, was cut to the same sizes as the intermediate rails. The top rails are of peculiar shape, with irregular layout. At the base, ¾ of an inch in from the bottom, is a flange 1½ inches wide for holding the sash frames. Here too the heavy duty cutter did excellent work in cutting the extrusions to size rapidly.

About Construction

The sash frames which hold the heat-tempered, shock-resisting glass in rubber extruded gaskets, were made

Shop-made cutter, with air and oil line nozzles and special blades, cut all the extruded pieces for Grand Coulee Dam Crest railing in record time.

This shop-made miller for rounding corners of completed posts saved almost 1,000 hours of filing; all 500 posts were rounded in three days. The cutter turned at 3,500 r.p.m.

so that two frames fitted into each top rail section. All parts of the sash frames were of solid aluminum extrusions. The short end sash members (2½ inches wide by ¾ inches thick by 9 inches long), and the long side sash members (¾ inches by ½ inches in cross-section and 5 feet long) were all cut to size in the cutter and by the same procedure.

After cutting the end sash members to size, a ½-inch and a 9/16-inch offset was milled on each end by standard milling methods. Then four holes were drilled and tapped in at an angle on one end, and two others drilled and tapped in straight at the other end. As 8-32 screws and 10-32 screws were to be used, the drilling and tapping was rather difficult. A holding jig was made with two ordinary bolts attached to one end. The bolts raised up the jig the required degree for drilling at an angle, and the jig was turned upside down for the straight drilling.

This same little jig was used for holding the end sash members horizontally while holes for the locking device were drilled ⅜-inch diameter and ⅝-inch counterbored. The lock-pin with its shoulder fit in the counterbore recess. A cam-like flange was used for locking the ends of each frame. While the jig was in a horizontal position still another hole was put in the end members for locking the stock piece containing the glass.

The long side sash members had their ends mill miter-jointed to fit the bottom of the end sash members. Holes were drilled to match those in the end members. One long member of each frame had three mill cut-outs made for hinges, and the holes drilled for the hinges, all in conventional manner.

Ingenuity Needed

A simple rectangular extrusion was cut to size and holes drilled in it so that it could be used as a stop for holding the glass. The short end and the long side sash members were assembled in wooden frames on benches and screwed together. The two completed sash frames were fitted to the top rail by means of hinges on the side of the rail during final assembly at the dam. The contracting company furnished the reflectors, with Alzak finish, for the fluorescent tubes used for lighting.

Posts were all aluminum alloy castings obtained from a foundry in Tacoma, Washington. The rectangular shaped posts had a flange at the bottom which when drilled with holes fitted the posts onto the steel anchor. Minimum thickness was ⅜ inches all around.

The rough blank castings were machined in the milling machines and then put in a unique shop-made jig for drilling the necessary holes. All holes had to be made accurately, to match a second part (the flange to match the anchor holes, for example) and the work could not be done by hand to get the proper hole alignments. The unique jig was bolted to the base of the drill press, and the spindle stayed in one position for drilling of all holes.

Each post was placed upside down in the jig with the flange end up. A set of three holes on the right was first drilled, then the post moved mechanically to a second position where the left hand holes could be drilled.

The post was then removed and placed in the jig horizontally, where 8 to 10 holes were drilled on the front face (for holding a recessed removable panel for repair work). This was done in a similar manner, by drilling first one set of holes, then moving the post to its second position in the jig and drilling the second set of holes.

Holes were also drilled in the back of the post, to secure the intermediate railings, and six holes were drilled at the top of the post so that the top cap could be fastened to the post.

All these operations were performed in the one jig, saving a great deal of material handling time.

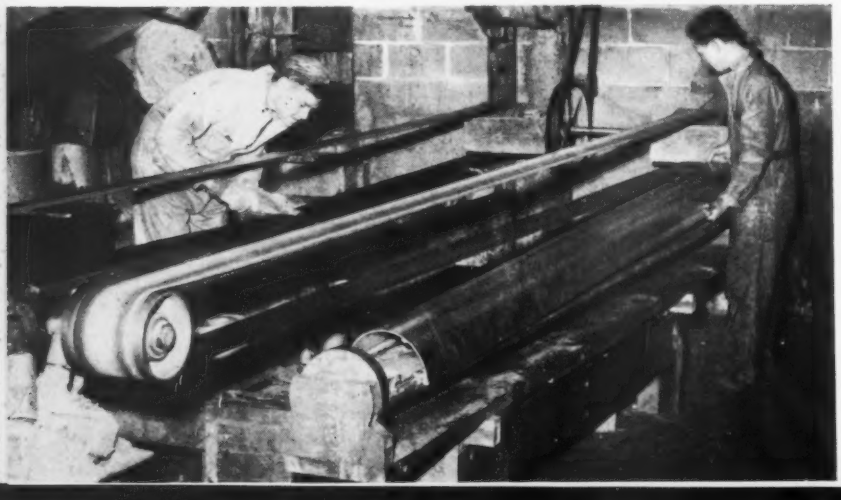
Another Time Saver

Another time saver was the routing work done on the posts, about 60 per cent saving in labor over putting the posts through milling operations. Two posts were placed in jigs on each of the two routing tables, and the templates adjusted on top of the posts. During actual operations one man put the posts in place and secured the templates, and one man routed, on each machine. One router was a standard Onsrud, the other a shop-made affair as far as the arms went, with a Stanley wood routing head.

The templates were ⅛ inch larger than the cut-out airfoil-shaped holes for the railings, so that a smooth cut could be made through the thick material by resting the bit holder in place. The holes made in this manner were not only quickly made but also inexpensive, as each $2 bit cut 25 holes.

The post caps, into which the top rails fit, of open aluminum casting, were purchased nine inches long, and milled to size on both ends at the contracting company's plant. The shape of the cap, of course, is the same as the top rail. It is fastened by special ma-

Long intermediate and top rails were belt-polished by being placed in special shop-made wooden jigs positioned beneath the lower belt surface.



chine screws (3 on each side) to recesses in the front and back of the post. The hole for securing the top rail to the cap was drilled in a separate drill press for fast production.

Assembly

Completed posts and caps were assembled together in the following manner: the anchor was first bolted to a circular bench jig and the post clamped to the anchor. Then the bolts for holding the cap onto the post were put in place and fastened, the circular jig turning a complete circle to accomplish the work. While still in the jig, the holes for the top rail were checked with a gauge for size, as the fit had to meet exacting specifications (hairline joints, etc). Four of these assembly jigs were secured to one big work bench to consolidate the operation and save time.

Finally the corners were rounded on a shop-made machine which saved almost a thousand hours of filing. It took better than an hour to file all the corners of one post by hand; all 500 posts had their corners rounded on the shop-made machine in three days. (Because of the irregular contours, cam milling would have been expensive.) The shop-made machine was simply a ball-bearing unit, used for a guide, with a high-speed cutter beneath it at table-top level. The posts were hand pushed along the cutter, the cutter turning at 3,500 r.p.m.

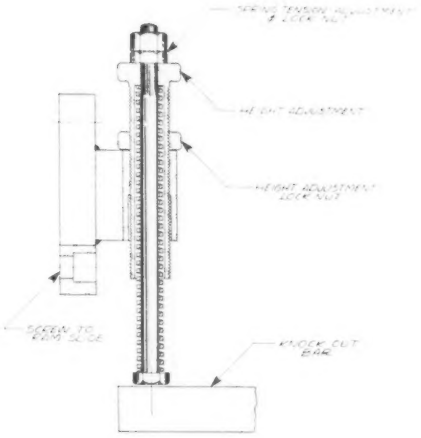
Polishing

After the various component parts of the railing had been cut and assembled, milled and sanded, they were ready for belt polishing, to reduce the grain and produce the final satin finish. The short posts could be sanded in a polishing lathe but the intermediate and top rails were too long for polishing by means of lathes. Special machines had to be made to hold the long pieces. The rails were held in place on wooden jigs beneath the lower belt; pressure from the lower side of the belt was then applied to the rail by hand. Aluminum oxide belts were used, with grits changing from 60, 100, 120 to 180 in the fourth step of the belt polishing.

The railing was next taken to the degreaser, dipped in trichlorethylene solution to remove any residue, and then put through the conventional cleaning processes — cleaned and etched in sodium hydro-oxide to produce the uniform white color, rinsed in cold water and then put in sulphuric acid in the alumilite tank. The coated railing was then rinsed in clear running water, immersed in a sealer tank of hot water with acetic acid, removed and dried and wrapped for shipping.

Punch-Press Output Upped 30-40% by Ingenious Device

PUNCH PRESS production capacity is increased 30%-40% by an ingenious device that eliminates one of the inherent bottlenecks in pressing operations.



In the operation of a punch press, the metal stampings frequently stick in the die and must be pushed out by a knock-out plunger or pin which is built in the die block, usually in the upper section. This knock-out pin is in turn actuated by a cross-bar which is held down by adjustable pins at the sides of the press head.

Operation of standard mechanism of this type is not susceptible of increased speed beyond a certain point, because the part stamped is retained in the die until the press head has reached the top of its stroke.

This does not provide time for the released part to fall away from the die and be removed before the return stroke. Hence, the delayed action in knocking out the stamping is a bottleneck limiting production speed.

George Jones, die setter leaderman at National Motor Bearing Co., Redwood City, Calif., reasoned that if the knock-out crossbar could be actuated at an earlier stage in the return stroke, there would be more time for removing the stamping and production of the press could be substantially increased.

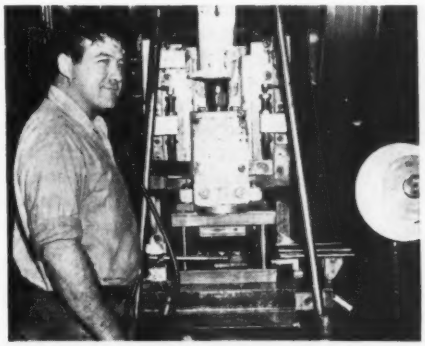
To solve this problem, Jones conceived the idea of providing a strong spring to hold each of the knock-out bar stops in a much lower position than normally possible. He could not permanently lower the position of the knock-out bar stops, since there would then not be enough freedom for the press head to rise to its top position.

A result of Jones' invention is that when the press head rises, the stamping is knocked out by these springs at a relatively low point in the return stroke. The springs then compress during the remainder of the return stroke without any damage to the press head.

By use of this device, (patent pending) capacity of the press is increased from a maximum of about 50 stampings per minute to as many as 65 or 70 stampings per minute, when operating one of the regular presses on oil seal cups.

Potential savings from the application of this invention to a large number of presses in a metal stamping plant are obvious. Cost of installing the device is very small.

GEORGE JONES
inventor, with model on press.



WHAT ABOUT MANPOWER?

Industry Wants to Know...

How to prepare for losses through the draft

How to keep a Reservist in a key job

What about a labor freeze

By WILLIAM HART
General Personnel Supervisor
Crown-Zellerbach Corporation
San Francisco

COL. HART was with Selective Service from the first planning days, in 1935 until activation of the program in 1940, when he went on duty at National Selective Service Headquarters. He served as chief of several divisions as planning officer and finished that service as assistant deputy director of Selective Service.

He is a Colonel in the Army Reserve, and in command of the Bay Area reserve Selective Service training unit.

TOO MANY, it seems the mobilization has raised so many questions regarding manpower that it is futile to lay plans to meet them.

It is not the purpose of this article to settle the questions that can be answered based on facts or history, nor through clairvoyance, to offer predictions on such topics as size of the mobilization, or the timing of a labor freeze.

Rather, here will be presented background information, facts and basic premises. With them it will be possible to make operational plans and to adjust those plans as we pass from one phase to another.

Of First Importance

The first task is to examine and understand our starting point. Basically, when mobilization comes the nation steps into the labor market with the first right for the manpower it needs.

The number one job is to win the war. All other requirements become secondary. Our tool for concluding the struggle is the Armed Force backed up by the men and women producing the articles of war. Of all the nation's requirements for men, these two come first.

There are many men and women who can fulfill the requirements of industry, but only limited numbers of men who can meet the combat physical standards of the Armed Forces.

The rigors of war require the cream of the crop for the fighting force. They become the hardened steel on the cutting edge of our sword. From experience, we know that essentially these are the men from 18 to 36.

Our potential enemies have manpower reserves in excess of the combined resources of the United States and those nations we can count upon as allies. Therefore, it would appear that in a total war, we will require as large a fighting force as we can muster and sustain.

There is not the flexibility in the labor force that we had in 1940-1941. The cushion that existed through substantial numbers of unemployed has been wiped out. As men enter service we will be forced to recruit from groups not now in the labor force more rapidly than we did in World War II.

The Situation Today

The present situation does not yet indicate how great an effort we will have to make. For safety, we must plan on total mobilization, with the realization that we can step off that road at any point while we are enroute.

With our requirements having to be met by the single men under 26, it can be expected that within a few months the base upon which the call will be levied will have to be expanded. What choices are open? In other words, who goes next?

The armed forces will want veterans. Will the nation let them have them? It is impossible to say at this time, for the choice will be difficult. Who should be next? Single veterans? Married men non-veterans? 18-year-olds?

And when we have exhausted that group, where is the next base? Do we add a registration up to 36 and start again moving up from age 25 to take single veterans. (This age has almost

no non-veterans who are acceptable. These men were the prime age group from 1941 to 1945.)

Questions such as these probably can not be answered until we are close to the time the decision is to be made. The military situation at that time will have a bearing on the answer. The press will be alert to the problem, and will assist in formulating an opinion.

Of all these choices, the only action open to Selective Service without congressional action is to take non-veteran married men or fathers 19 to 26.

It would appear that as far as the draft is concerned, there are sufficient men now vulnerable to allow us to follow the present course until the first of the year. Before then it should be possible to predict the next move.

Managements who seek extended deferments of members of the reserve may find that their arguments for continued deferment are materially weakened by those advanced by the Armed Forces. They can point out that the man's reserve status has been known for a long time.

The onus then is upon management to show why it has been impossible to prepare a replacement.

Though as yet we have no indication but that all reserve officers will be called in the near future, it is not unreasonable to expect some modifications. Some reservists are not too desirable, because of their age and grade. Almost all World War II Naval officers were released on a basis making them subject to call. That would indicate there are enough officers for a Navy several times our present size.

Evidence so far points to higher calls for Air, Marine and Naval Air officers than for Army officers. Calls for Army and Navy officers will probably continue on a selective basis for quite some time.

Questions and Answers About Your Manpower Problems

Will a firm manufacturing essential material for the armed services receive any assurances that their labor force will be allowed to remain intact until such work is completed?

No blanket assurance can be given. The armed forces have first call on young men 18 to 26 and high priority 26 to 36. A labor freeze would help hold those under 36 who are unfit for duty and those over 35 for whom as yet the armed forces have not indicated an interest. Check your possible losses to service. Are they as serious as those to other industries?

To what agency would a company appeal in such a situation as the above?

Possibly to the Industrial Mobilization Committee of the National Security Resources Board.

What procedure is necessary for a firm to follow in requesting exemption of individual workers?

There are no provisions for exemptions except those listed in the Selective Service Act. Primarily these include elected Government officials.

What are the steps to be followed in determining the deferring of key personnel?

Deferment of key personnel is a responsibility of the agency having jurisdiction. Selective Service has responsibility for men subject to the draft. The appropriate armed service is responsible for its reserves.

When will the government classify workers with critical occupational skills, such as machinists, tool and die workers, boiler makers and so on, who are not part of the Reserves or National Guard?

Classification will proceed as rapidly as possible from age 25 down through age 19.

Have the length of deferments of key personnel been established as yet?

Selective Service regulations and Department of Defense directives permit deferment for a maximum period of 6 months. This period is provided to allow for the hiring and training of a replacement.

Regarding apprenticeship training programs of critical classifications, will there be any guarantee that apprentices now in training will be allowed to finish their programs?

In event of full mobilization there can be no guarantee that apprentice programs will continue.

To what agency should local joint apprenticeship committees of critical trades apply for information concerning deferment of these apprentices?

No agency has been designated yet. No doubt the N.S.R.B. has committees working on this topic.

To what extent can local joint apprenticeship committees depend on deferments in the future for those young men who are not now draftable, but who will be entering the apprenticeship programs in the near future?

If they are under 26 and we have full mobilization, there will be little chance to keep them.

How long will such deferments be granted to graduated apprentices who continue to work in their trade doing essential war work, but not assigned to such work by the government?

Deferments at any one time are limited to 6 months. At the end of that time they are subject to review both from the standpoint of the man's work, and the firm's effort to secure and train a replacement. A tightened standard might also have come into effect to broaden the base for draft vulnerables.

The Probable Course of Mobilization

1. Deferments may be sought for periods up to 6 months for Reservists in critical occupations in essential industries.

2. It will be some months before the present draft base will have to be expanded. (Unless draft calls are greatly increased.)

3. Before the first of the year it should be clear whether mobilization will be full scale or limited.

4. In event mobilization is full scale, plan to lose all able bodied men under 26 and almost all under 36, together with all Reservists.

5. Deferment standards will tighten successively as it becomes necessary to expand the base to provide new groups for induction.

6. A labor freeze will probably come only if labor pirating, absenteeism and turnover reach a point where they are deterring the war effort.

With the course of mobilization evident, a short term plan is possible. A group of immediate vulnerables can be established. It should include the single non-veterans 25 through 19 (listed in that order) together with the Reserves.

Tentative plans can be set for the next group, based on the information given in this article.

For long range forecasting, in event of full mobilization, plans must be based on the loss of all physically acceptable men below 26, and most all under 36.

The possibility of an eventual labor freeze must also be taken into account.

Installment No. 7 . . . Western Industry's survey of operating methods and systems

Southern California Leads The West in Time Study; Western Interest in Subject Encouraging

THIS INSTALLMENT of *Western Industry's* cooperative survey of operating methods and systems in 211 Western plants deals with time study. It is of particular interest to note that the use of time study as an aid to establishing production and labor standards, the development of estimates, and planning and scheduling activities, is more than twice as great in Southern California as in other areas of the West.

Here the figures:

PER CENT OF TOTAL NUMBER OF PLANTS REPORTING IN EACH AREA

	Southern California	*Northern California*	*Other Western Areas*
Plants basing labor costs on measured requirements set by time study	66	35	22
Plants using time study for establishing production standards	70	33	27
Plants using time study for estimating	69	30	28
Plants using time study for planning and scheduling	63	31	21

But the West is not so far behind the East and Middle West in its interest in time study as is generally supposed, if the attendance at West Coast meetings on rating of time studies conducted by the Society for the Advancement of Management, is a criterion. At two West Coast meetings held in Los Angeles May 4 and May 9 of this year, the attendance was 54% greater than at similar meetings anywhere else in the country.

Industrial engineers of high standing have reviewed the survey results for *Western Industry*. They attribute the high degree of time study usage in Southern California to the influence of

Are your labor costs based on measured requirements set by time study? 60 Are they based on estimates? Pretty generally. Score is 109 Yes; 68 No

Designations "Western," "Eastern" and "Mixed" indicate whether methods and systems were independently developed in the West, or formulated by eastern management or parent company, or are a combination of both. Numbers indicate number of plants.

Southern California

	Yes	*No*
Western Methods	17	10
Eastern Methods	5*	2
Mixed Methods	3	1

*One plant partial.

Eastern Washington

	Yes	*No*
Western Methods	....	3
Mixed Methods	....	1

Northern California

	Yes	*No*
Western Methods	6	16
Eastern Methods	3	1

Idaho

	Yes	*No*
Western Methods	....	4

Oregon

	Yes	*No*
Western Methods	3	13

Utah

	Yes	*No*
	5	11

Western Washington

	Yes	*No*
Western Methods	11	49
Eastern Methods	2	6
Mixed Methods	....	3

Colorado

	Yes	*No*
Western Methods	5	1

Are they based on estimates? Pretty generally. Score is 109 Yes; 68 No.

Southern California

	Yes	*No*
Western Methods	12	10
Eastern Methods	3	4
Mixed Methods	2	1

Eastern Washington

	Yes	*No*
Western Methods	2	1
Mixed Methods	2	....

Northern California

	Yes	*No*
Western Methods	10	10
Eastern Methods	1	1

Idaho

	Yes	*No*
Western Methods	2	2

Oregon

	Yes	*No*
Western Methods	8	8

Utah

	Yes	*No*
	10	7

Western Washington

	Yes	*No*
Western Methods	44	20
Eastern Methods	7	1
Mixed Methods	1	2

Colorado

	Yes	*No*
Western Methods	5	1

Western Industry's survey has been carried on in cooperation with eight universities in the West and a number of management consultants, to assemble facts concerning actual operating conditions in industry in the West.

Reports were obtained from 211 plants in California, Oregon, Washington, Idaho, Utah and Colorado through a detailed questionnaire, covering division of functions, organization charts, communications, manufacturing programs, controls and budgets.

In order to determine the comparative efficiency of industry in the West and the older industrial areas of the country, the reporting plants were designated as "Western Methods," "Eastern Methods" and "Mixed Methods," to indicate whether their systems were developed in the West, whether they operated under programs emanating from Eastern home offices, or were a mixture of the two.

Last month labor cost controls were covered. Next topics will be wage incentives and quality control.

MUCH ELECTRICAL MANUFACTURING MAGIC BEGINS HERE

● One of the best known manufacturers of air circuit breakers in the country is the I-T-E Circuit Breaker Company, located at 19th and Hamilton Streets in Philadelphia. From its inception the company has displayed unusual receptiveness to new ideas, whether from within or without; hence it has done its share of pioneering, and perhaps more. Revere is proud to play a part in its progress, through close collaboration with I-T-E engineers, production men, and the purchasing department. The extensive use of Revere Extruded Shapes is but one result of our mutual attack upon I-T-E problems, which the company is good enough to say has saved a great deal of money, as well as made possible a better product . . . Perhaps similar results would be obtained if you gave us the opportunity to place our knowledge as well as our metals at your disposal. Why not inquire?

REVERE

COPPER AND BRASS INCORPORATED

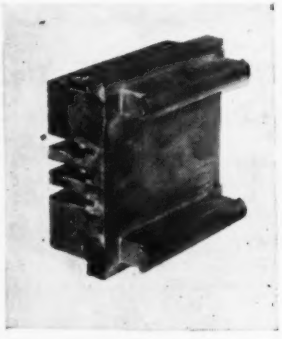
Founded by Paul Revere in 1801

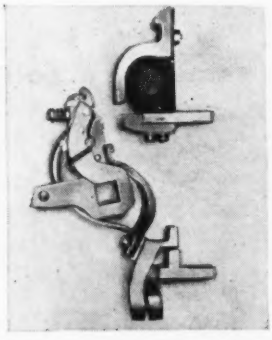
230 Park Avenue, New York 17, N. Y.

Mills: Baltimore, Md.; Chicago, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.— Sales Offices in Principal Cities, Distributors Everywhere

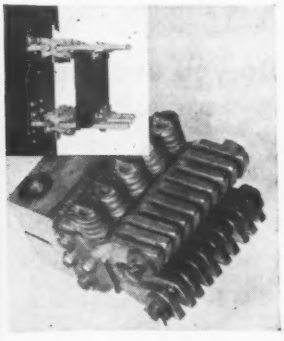
Pacific Coast District Sales Offices in San Francisco, Seattle, Los Angeles.

This is but a part of the I-T-E Stock of Revere Extruded Shapes in copper, brass, manganese bronze, and aluminum. I-T-E is a great advocate of extruded shapes, from long experience finding them markedly superior, in uniformity, strength, and economy due to the fact that a great deal of machining is avoided.





(*Left*) I-T-E Contact Block made from an extruded shape. This was formerly extruded in electrolytic copper; changing to Revere Free-Cutting Copper resulted in a saving of 30% in machining time. (*Right*) I-T-E "K" Breaker, Main Contact Assembly in open position. This is an especially interesting assembly, since it shows no less than eight extruded shapes in copper and bronze. Use of these shapes makes the assembly more compact, stronger, lighter, and considerably more economical to produce. The contacts are silver alloy, and the unit is silver plated. . . . In addition to supplying I-T-E with extruded shapes, and strip, Revere furnishes rolls, bar, rod, sheets, in a wide range of non-ferrous alloys, and seamless brass tube.



(*Left*) Main movable Contacts and Flexible Connectors in an I-T-E "K" Type Circuit Breaker. The two contacts are made from Revere Extruded Shapes. Revere and I-T-E collaborated closely on the specifications for the thin-gauge copper strip for the pigtails, working out the correct gauge and temper to avoid notch effects and cracking of the connection at the braze. (*Right*) Main Separable Contacts from an I-T-E Type "LG" Circuit Breaker. These are stamped from Revere Copper Strip with the temper specially controlled to eliminate a de-burring operation previously found necessary to obtain edge surface suitable for electrical contacts. (*Inset*) Back view of "K" type Breaker showing a similar type of contact.

the aircraft industry which, during the tremendous growth occasioned by World War II, utilized industrial engineers to ease both the growing pains and the myriad of planning, scheduling and cost problems incident to such an industry.

They review the survey further as follows:

Establishing Standards

"The survey results demonstrate considerable reliance on performance records for the establishment of labor standards. This was to be expected, since it is usually necessary to use records to develop standards for many labor types even though time studies are utilized for other purposes. It is to be noted that industries in Southern California, while depending heavily upon performance records, nevertheless depend less upon performance records than do other areas which do not use time study to the degree found in Southern California.

General Comment

"Advanced industrial engineering techniques (i.e., motion time standards, standard data, etc.) are put to greater use in Southern California than in other areas by a significant margin. This would indicate that Southern California not only uses industrial engineering techniques more extensively, but also with greater thoroughness.

"Approximately 40% of the concerns contacted indicate that estimates are not used in the development of labor costs. It is highly improbable that this is an accurate reflection of facts, since the association of indirect labor costs (e.g., maintenance, service, overhead, etc.) to the product is extremely difficult and normally accomplished by qualified estimate.

Summary

"Based upon the assumption that a representative sampling has been used, it may be inferred that:

(1) The application of industrial engineering techniques *closely* follows the economic development of an area by large industries normally utilizing advanced management techniques,

(2) Insufficient attention is devoted to the problem of proper alloca-

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Designations "Western," "Eastern" and "Mixed" indicate whether methods and systems were independently developed in the West, or formulated by eastern management or parent company, or are a combination of both. Numbers indicate number of plants.

Are they based on past performance records? Overwhelmingly. 176 say Yes; 20 say No.

Southern California

	Yes	No
Western Methods	19	5
Eastern Methods	5	2
Mixed Methods	2	1

Northern California

	Yes	No
Western Methods	19	2
Eastern Methods	2	....

Oregon

	Yes	No
Western Methods	25	....
Mixed Methods	2	....

Western Washington

	Yes	No
Western Methods	62	5
Eastern Methods	7	1
Mixed Methods	4	....

Eastern Washington

	Yes	No
Western Methods	5	....
Mixed Methods	2	....

Idaho

Yes	No
16	2

Utah

	Yes	No
Western Methods	4	1

Colorado

	Yes	No
Western Methods	2	1

Do you use time study for establishing production standards? 71 say Yes; 125 say No.

Southern California

	Yes	No
Western Methods	19	9
Eastern Methods	4	1
Mixed Methods	3	1

Northern California

	Yes	No
Western Methods	6	17
Eastern Methods	3	1

Oregon

	Yes	No
Western Methods	5	21
Mixed Methods	1	1

Western Washington

	Yes	No
Western Methods	13	51
Eastern Methods	....	8
Mixed Methods	2	2

Eastern Washington

	Yes	No
Western Methods	1	4
Mixed Methods	....	2

Idaho

	Yes	No
Western Methods	....	3

Utah

Yes	No
9	4

Colorado

	Yes	No
Western Methods	5	....

Do you use it for estimating? About the same score. 68 say Yes; 121 say No.

Southern California

	Yes	No
Western Methods	17	10
Eastern Methods	5	1
Mixed Methods	3	....

Northern California

	Yes	No
Western Methods	5	18
Eastern Methods	3	1

Oregon

	Yes	No
Western Methods	3	21
Mixed Methods	....	1

Western Washington

	Yes	No
Western Methods	19	44
Eastern Methods	....	8
Mixed Methods	2	2

Eastern Washington

	Yes	No
Western Methods	....	4
Mixed Methods	....	2

Idaho

	Yes	No
Western Methods	....	3

Utah

Yes	No
9	4

Colorado

	Yes	No
Western Methods	2	2

Do you use it for planning and scheduling? Still less. 56 say Yes; 128 say No.

Southern California

	Yes	No
Western Methods	16	11
Eastern Methods	4	2
Mixed Methods	2	....

Northern California

	Yes	No
Western Methods	5	17
Eastern Methods	3	1

Oregon

	Yes	No
Western Methods	3	20
Mixed Methods	....	1

Western Washington

	Yes	No
Western Methods	11	49
Eastern Methods	1	7
Mixed Methods	2	2

Eastern Washington

	Yes	No
Western Methods	....	4
Mixed Methods	....	2

Idaho

	Yes	No
Western Methods	....	3

Utah

Yes	No
6	7

Colorado

	Yes	No
Western Methods	3	2

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tion of cost to product by a large percentage of the concerns covered by the survey, and

(3) The so-called 'backwardness' in the acceptance of advanced management techniques by Western industries is simply a natural time lag to be expected as new economic areas are developed."

Rating Meetings Results

In the Southern California time study rating meetings, two points of note were brought out, according to P. A. Hopkins, methods study engineer for Sears, Roebuck & Co., who was chairman of the S. A. M. committee in charge. They were as he reports:

1. On the encouraging side, that ratings from the norms are surprisingly small; one can safely conclude that the great majority of time study ratings being made in today's industry are accurate.

2. Not so encouraging (but true of Eastern as well as Western industry) is the large number of variations in makeup of incentive plans, the many different "payoff" points, the many different methods of measuring production, etc., etc.

"In considering this latter point," says Mr. Hopkins, "here is a place where the West can carry the ball. Some place along the line, maybe through the S.A.M. at the instigation of and on the impetus supplied by *Western Industry*, we in Industrial Engineering can do a bit of methods work on our own profession to bring about a greater standardization than now exists.

"And there are lots of other problems in Industrial Engineering that we have little opportunity to observe beyond our own bailiwick. The fact that we had over 250 men come to a meeting *to work* is proof of the number of really interested men there are in our line, interested in improving their professional techniques if nothing else.

"It looks like *Western Industry* is off to a good start this year in writing toward the interests of our profession. Can we count on an intensification of this slant? You can do a job for us that is a first-class need."

Designations "Western," "Eastern" and "Mixed" indicate whether methods and systems were independently developed in the West, or formulated by eastern management or parent company, or are a combination of both. Numbers indicate number of plants.

Do you use it for wage incentives? Not very much. 40 say Yes; 149 say No.

Southern California

	Yes	No
Western Methods	15	13
Eastern Methods	3	3
Mixed Methods	3	1

Northern California

	Yes	No
Western Methods	3	22
Mixed Methods	....	1

Oregon

	Yes	No
Western Methods	1	21
Eastern Methods	2	2

Western Washington

	Yes	No
Western Methods	3	57
Eastern Methods	....	8
Mixed Methods	1	2

Eastern Washington

	Yes	No
Western Methods	1	4
Mixed Methods	....	2

Idaho

	Yes	No
Western Methods	....	3

Utah

	Yes	No
	4	9

Colorado

	Yes	No
Western Methods	4	1

Are your time studies made by stop watch? About even up. 73 say Yes; 69 say No.

Southern California

	Yes	No
Western Methods	17	6
Eastern Methods	4	1
Mixed Methods	4	....

Northern California

	Yes	No
Western Methods	6	5
Eastern Methods	3	....

Oregon

	Yes	No
Western Methods	4	10
Mixed Methods	1	1

Western Washington

	Yes	No
Western Methods	17	31
Eastern Methods	2	3
Mixed Methods	2	1

Eastern Washington

	Yes	No
Western Methods	2	1
Mixed Methods	1	1

Idaho

	Yes	No
Western Methods	....	1

Utah

	Yes	No
	5	7

Colorado

	Yes	No
Western Methods	5	1

Are they made by standard data? Idea not so popular. 62 say Yes; 71 say No.

Southern California

	Yes	No
Western Methods	17	4
Eastern Methods	3	2
Mixed Methods	3	....

Northern California

	Yes	No
Western Methods	4	6
Eastern Methods	3	....

Oregon

	Yes	No
Western Methods	2	10
Mixed Methods	....	1

Western Washington

	Yes	No
Western Methods	16	34
Eastern Methods	2	3
Mixed Methods	2	2

Eastern Washington

None.

Idaho

	Yes	No
Western Methods	....	1

Utah

	Yes	No
	6	6

Colorado

	Yes	No
Western Methods	4	2

Are they made by motion time standards? Even less in favor. 37 say Yes; 83 say No.

Southern California

	Yes	No
Western Methods	11	10
Eastern Methods	4	1
Mixed Methods	2	....

Northern California

	Yes	No
Western Methods	5	5
Eastern Methods	1	1

Oregon

	Yes	No
Western Methods	2	9
Mixed Methods	....	1

Western Washington

	Yes	No
Western Methods	5	38
Eastern Methods	1	4
Mixed Methods	1	2

Eastern Washington

	Yes	No
Western Methods	2	....

Idaho

	Yes	No
Western Methods	....	1

Utah

	Yes	No
	2	8

Colorado

	Yes	No
Western Methods	1	3

MUSCLE MEN . . . Serving the Nation Well

Judd Barner operates a Lorain Power Shovel for the Dallas County Road Commission, Fordyce, Arkansas. Says Judd: "It is a tough little machine and I enjoy operating it."

Men like Judd Barner who are helping to build a better America know that a machine —like a man—is only as strong as its muscles . . . which, in the case of Judd's shovel, are its fasteners.

To be sure its shovel will withstand the bone-rattling service Judd will give it, The Thew Shovel Company insists upon top-quality fasteners—which pay off in dependable performance out on the job.

John Waring operates a bolt-maker in RB&W's Port Chester plant. Automatic cold-heading, which RB&W originated, accounts for the superior strength, greater accuracy, almost perfect uniformity and improved appearance of RB&W bolts.

Here, and in other manufacturing steps, RB&W builds into its bolts and other fasteners the maximum soundness that enables them to resist the shocks of such service as Judd Barner and his shovel will give them.

Fasteners, which keep a product well-muscled, cost so little compared to the other components . . . isn't it sensible to specify the soundest fasteners?

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105 Years Making Strong the Things That Make America Strong

Heat Treating Steel for machinability

By F. J. ROBBINS
President, Sierra Drawn Steel Corp.
Consulting Metallurgical Engineer, Los Angeles

and

J. J. LAWLESS
Metallurgist for the Manufacturers
of PROTO tools

IN ORDER to prepare for a discussion of the subject it is necessary to establish a definition of the general term "machinability," and to discuss briefly some of the other important aspects of machinability in order to emphasize the requirement for heat treatments in certain applications.

Best definition of "machinability," from a practical standpoint, is one that was given in a symposium of five lectures presented to members of the A.S.M., October 17-21, 1938. "The most machinable steel is one which will permit the fastest removal of the greatest amount of material (before resharpening the tool) and with a satisfactory finish."

This definition is brief and general, but satisfactorily includes both the quality and economy phases of the subject.

Variables involved in providing material, treatments, tooling, and procedures to assure most satisfactory machine operation are so numerous as to make each new job a distinct problem in itself.

J. J. LAWLESS

Many investigations have shown that tooling, machine technique, coolants, type of equipment, and many other factors affect machinability, influencing finishes, operating speeds, and tool life. However, variables having to do with tooling and procedures, notwithstanding their important effects on operating results, have only an indirect influence upon the metallurgical problem.

For this reason such factors will be assumed to be optimum in their effect for the ensuing discussion. Under the headings "Materials" and "Treatments" come a variety of metallurgical factors that influence machinability.

In considering machinability it should be kept in mind that a tool edge in passing through metal must separate the material in its path from the stock, and then the separated material must be moved out of the path of the tool, preferably breaking off at convenient intervals.

Separation of material from the stock requires a degree of energy proportional to the tensile strength of the material, and plastic flow (as before a cutting tool) of the material depends upon the ductility.

Unfortunately, ductility and tensile are normally conflicting properties; furthermore, higher tensile strength generally accompanies treatments intended to lower ductility and conversely.

Sometimes, in cutting materials of relatively high ductility and low tensile strength, plastic flow of the material occurs before rupture from the stock and the result is a ragged inferior finish. On the other hand, materials high in tensile strength, even though low in ductility, subject tools to severe stress and wear conditions, and poor tool life results.

It is true that tensile strength and ductility are what might be considered symptoms of a fundamental condition that the material happens to be in; that is microstructure, grain size, hardness, analysis, etc. But to the machine tool and its operator the only important consideration is the properties of the material which affect its machinability.

Therefore, it is the objective of any machinability specification to provide a material with which the best compromise tensile strength and ductility properties can be obtained. In a sense, "best compromise tensile and ductility properties" is a sort of performance specification applied by the metallurgist to his product.

The tensile-ductility relation is the most important metallurgical require-

F. J. ROBBINS

ment in the machinability problem.

Attempt to control the tensile-ductility relation in steel has been along many lines. Additions of alloying materials and nonmetallics to steel have proved beneficial in some instances.

For example, it has been found that increased sulphur content in steel materially improves machinability by creating nonmetallic discontinuities which decrease the overall transverse ductility of the material without serious effect upon longitudinal tensile strength, although other properties, such as impact, are affected adversely.

Additions of sodium bisulfite embody a different principle. It is claimed that such treatment removes abrasive particles such as oxides from the steel, thus to improve tool life and permit faster machining.

Many other addition agents have been found to effect machinability; lead, phosphorus, selenium. However, those addition agents which are dependent for their effect upon the nonmetallic discontinuities which they create in the steel invariably lower the transverse physical properties.

Consequently, the use of such additions to the alloy steels for application under high strength requirements is not usually good practice. For this reason, it is in the field of higher strength materials that thermal treatments are most often employed to control machinability.

Occasionally, depending upon the application, it is possible to tolerate some sacrifice of properties in a high strength material in order to obtain maximum machine economy.

Cold working may also be employed to alter the tensile-ductility relationship. This treatment increases tensile strength of the material to a degree, but reduces ductility to a greater degree.

Cold drawing also provides uniform size, shape, surface, etc., which are desirable for mechanical reasons, and produces higher tensile properties. Cold working and thermal treatments are used somewhat interchangeably or to supplement one another, either for metallurgical or mechanical reasons.

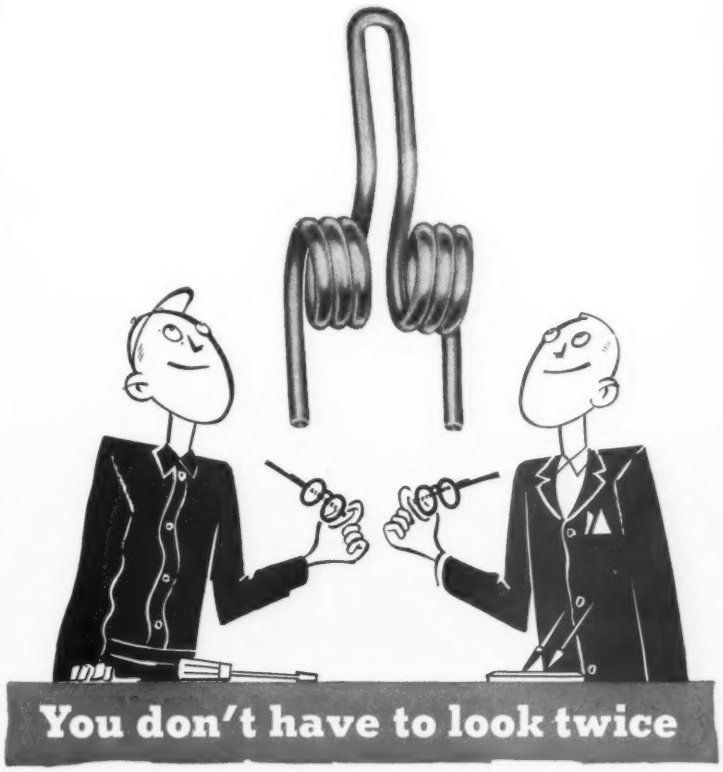
In Figure I, we show a classification in which carbon and alloy steels are rated according to their tensile-ductility relationship. It will be noted that increasing carbon and/or alloy content results in higher tensile strength and lower ductility, assuming that each material is in a similar condition.

Classification "II," in Figure I, indicates that 0.30% C straight-carbon and 0.20% C lean alloy steel may be expected to machine satisfactorily without special treatment. However, application of these grades is limited by the field service requirements on the part, and in applications requiring material of higher or lower properties something generally needs to be done to adjust the tensile-ductility relation.

Figure I. MACHINABILITY CLASSIFICATION FOR VARIOUS RANGES OF CARBON AND ALLOY CONTENT IN STEEL

CLASS.	DUCTILITY TENSILE RELATION	CARBON STEELS	LEAN ALLOY STEELS	HIGH ALLOY STEELS	TREATMENT POSSIBILITIES
I	Ductility ↑ Tensile ↓	Low Carbon, Open Hearth Bessemer, Etc.	.....	.....	Cold Drawing: Water Quenching
II	Ductility ↓ Tensile ↑	.25% to .35% C	.20% C	.....	None.
III	Ductility ↓ Tensile ↑	.35% to .55% C	.25% C	.20% C	Anneal to Lamellar Pearl.: or Part. Spheroidize, Cold Dr.
IV	Ductility ↓ Tensile ↑	.55% C Up	.35% C Up	.25% C Up	Part to fully Spheroidize, Cold Dr.

Through several heat treatment procedures it is possible to adjust the tensile and/or ductility level of certain steel for a particular machine operation. It is the purpose of this article to



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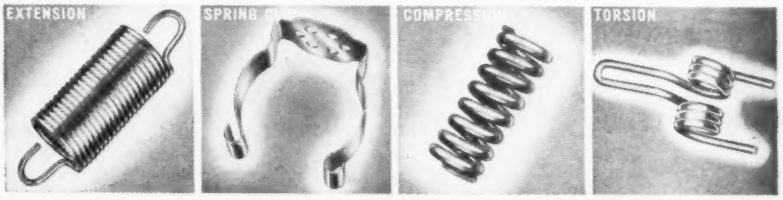

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Figure II. AVERAGE PHYSICAL PROPERTIES OF C-1018 IN THE HOT ROLLED, COLD DRAWN, AND WATER QUENCHED CONDITION

	HOT ROLLED	COLD DRAWN	WATER QUENCHED 1625°F
TENSILE STRENGTH psi	69,000	78,000	109,000
YIELD POINT psi	47,000	53,000	85,000
ELONGATION % in 2"	30%	23%	7%
REDUCTION IN AREA %	58%	54%	23%
BRINELL NUMBER	143	165	225

Data from Ryerson Alloy Steel Reference Book.

discuss the effect of heat treatment on tensile strength and ductility, and to present several applications.

The tensile strength of a carbon steel depends upon the condition of carbides, that is, the degree of solution as produced by heating and cooling rates.

The amount of carbon present determines the maximum amount of carbides that may dissolve in a structure and be retained by rapid quenching.

Maximum strength of any carbon steel depends upon maximum retained solution of carbide in the quenched condition. The principal purpose of addition of alloys to an analysis is to reduce the cooling rate required for attaining maximum properties (thus facilitating quenching), and to increase the ductility of the material.

Under these conditions the low carbon steel in Classification "I" would be low in strength even if it were possible to achieve the maximum possible strength of the material through heat treatment. Furthermore, the low carbon materials are highly ductile, and since machinability will undoubtedly tolerate the maximum tensile strength possible in these grades, the problem is to lower the ductility.

Two treatments are possible to achieve reduction of ductility in the low carbon steels. In bar form, drawing has the effect of lowering the ductility of these materials while increasing the tensile strength only slightly. The result is a relatively crisper structure which parts from the stock with little preliminary yielding when a tool is passed through the material.

Better finishes with higher speeds and feeds result. However, many products, forgings being a notable example, cannot be conveniently cold worked in any way prior to machining.

In such cases water quenching has been found to be a suitable substitute for cold working, achieving lower ductility with only slight increase in tensile strength.

Here we have the first application of a thermal treatment, a simple cycle of heating to austentizing temperature followed by a water quench.

In order to illustrate the effect on tensile strength due to cold working and water quenching, we show typical physicals for samples of C-1018 in the as-rolled, cold drawn, and water-quenched condition in Figure II.

In this example, tensile strength is increased 13% by cold drawing and 58% by water quenching. On the other hand, ductility, as measured by percentage elongation in 2", was reduced 23% by cold drawing and 76% by water quenching. By either of the foregoing treatments the tensile strength is increased, but not to an extent that machinability is seriously affected.

The decrease in ductility, however, is sufficient to impart a degree of springiness to the structure which facilitates machining by allowing freer rupture of the chip from the stock before plastic flow has progressed to a point where surface finish is impaired.

Continued next month

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WASHING MACHINES FOR INDUSTRY

Western States Council Meeting

WESTERN States Council will hold their 1950 annual meeting at the Mapes Hotel, Reno, Nevada, starting Sunday, October 15, and ending Tuesday evening, October 17.

Here is a thumbnail sketch of the program, as now projected: Registration will take place on Sunday, and a cocktail party sponsored by the council will top off the evening.

Monday morning, after discussion of official business, the first speaker will be A. C. Prendergast, editor of *Western Industry,* whose topic is "Western Industrial Development."

He will be followed by John Reynolds, manager of Central Valley Empire Association, who will discuss "Community Problems and Report on Western Cotton Development."

Douglas Campbell, secretary of the Long Beach Chamber of Commerce, will talk on "The Effect of the Supreme Court Decision on Tidelands With Reference to States' Rights," and he will be followed by Walter Doty, editor of *Sunset Magazine,* discussing "Western Tourist Development."

Afternoon sessions will include: "Report on Sanitation and Recreation in the Forest Areas," by Jerry Carpenter, Director, Travel and Recreation Department, California State Chamber of Commerce; "Development of Lumber Industry, Particularly Wood Products," by Fred Brenne, Secretary of Eugene, Oregon, Chamber of Commerce; "Development and Restoration of Natural Resources of the West," by Lyle F. Watts, Chief, Forest Service, Washington, D. C.; "Western Mining Problems," by Roger O. Oscarson, Executive Secretary, Northwest Mining Association, Spokane, Washington; and "Public Land Problems and Programs," by Marion Clawson, Director, Bureau of Land Management, Washington, D. C.

Tuesday's morning session will be devoted to discussions of "Western Defense," "Manpower," and "Allocation of War Contracts and Other Plans of Defense Department." Speakers for these topics have not, at this writing, been confirmed.

General Wedemeyer will be the noon luncheon speaker, and the afternoon discussions will include: "Water Resources of the West," by Earl Murphy, Manager of the Idaho State Chamber of Commerce, and J. A. Ford, Manager of the Spokane Chamber; Committee reports will wind up that afternoon.

The banquet speech will be delivered by Senator Pat McCarran of Nevada.

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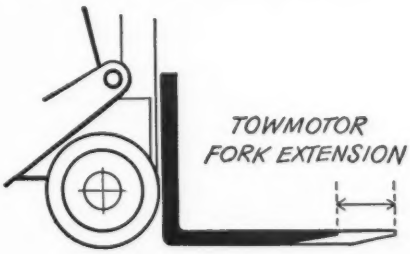

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TECHNICAL SHORTS

It's Old But It's Awfully Tough

TOO OLD to compete successfully with its more modern counterpart in metal turning, this thirty-one-year-old cone-drive Warner & Swasey turret lathe nevertheless is far from the scrap pile.

Converted to a centrifugal casting machine in the Federal-Mogul plant in San Francisco, it is used for the production of large solid bronze bearings and for lining steel or bronze bearings.

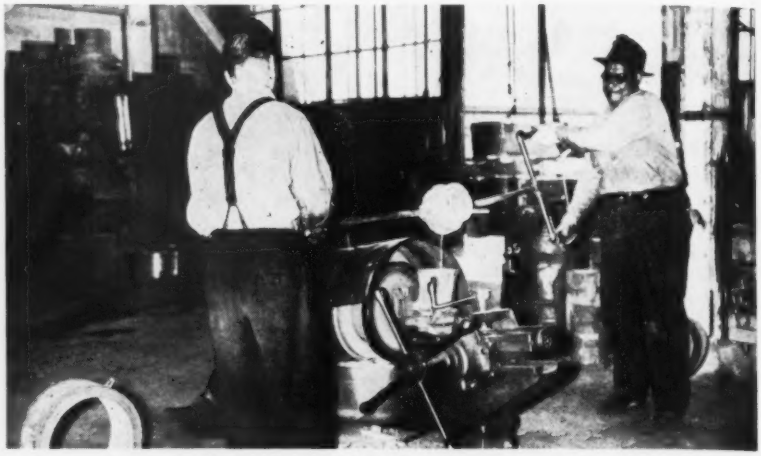
It Still Works

Cylindrical molds like the one at the left—or the bearing itself in case of a lining job—are held between flat face plates fixed to the spindle nose and turret slide. The latter plate has a hollow bearing which connects with a filler spout mounted on the slide.

When the machine has been brought up to speed, molten metal is poured into a filler spout, whence it enters the cavity between the face plates and is thrown against the mold by centrifugal force.

The machine base was removed to provide a convenient pouring height, and other non-essential parts were removed; part of the bedways were chipped away to permit swinging large-diameter molds.

This ancient lathe just wouldn't lie down and die. So they resurrected it and saved money.



Backstand of Ryman Belt Grinder manufactured by Ryman Engineering Co., Elwood City, Pa. NOPAK Model E Cylinder, controlled by NOPAK 4-Way Valve, maintains constant, uniform belt tension.

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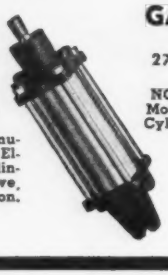

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What to Do With Wood Pulp Waste

According to the University of Washington Engineering Experiment Station, the multi-million dollar annual headache spinning around the problem of wood pulp waste disposal may have met its end.

If the wood pulp is produced by a new process they propose, an end-product will be a water-resistant glue, rather than water-polluting waste. So far, it has not definitely been determined that the process would be successful on a commercial scale: triethylene glycol, a key chemical in the process, is as yet too expensive.

Bror L. Grondal, professor of forest products, and Dr. Piotr Zenczak, are authors of the research report.

Overhead Bins Replace Muscles

A UNIQUE arrangement of overhead stock bins eliminates hand shovel-loading in a new battery of 12 automatic nut tappers now in operation at the Los Angeles bolt and nut plant of Bethlehem Pacific Coast Steel Corporation.

These bins are charged with untapped nuts by using the regular shop overhead crane and will provide the automatic tappers with a supply lasting from one day in the ⅞-inch size to a week for the smaller sizes. This arrangement eliminates shovel work and unsightly floor storage of stock.

The automatic tappers range in size from ¼ inch to ⅞ inch and will tap both regular and heavy type nuts, square or hexagon, made either on the hot nutmaking equipment or on the recently installed cold nut makers.

Spacing of the machines and elimination of floor storage of stock provides easy handling of the finished nuts either by fork lift trucks or by overhead crane.

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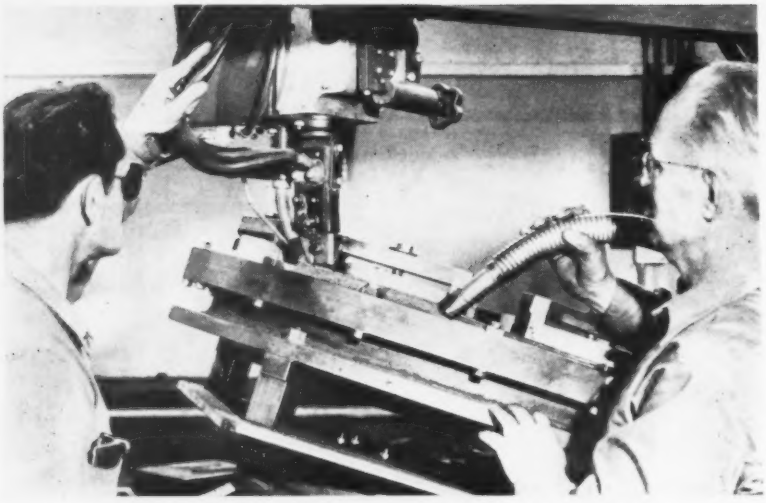
Maintaining Quality on High Speed Welding Jobs



Welding head and fixture shown make it easier for aircraft plant to turn out jet parts.

ONE OF THE TRICKS of high-production manufacturing is to do the job not only fast, but well. And good quality is difficult to maintain under pressure of high speed operation.

Solar Aircraft Co., San Diego, has set up a high-production welding line in which automatic hidden arc welding is used on 18-8 stainless steel parts, with uniformly good quality welds.

They are fabricating J47 turbo-jet components, and turning them out fast, with the aid of a standard automatic welding head manufactured by Lincoln Electric Co. of Cleveland, Ohio, using 18-8 type filler wire.

Excellent results are obtained with the welding technique worked out, involving rigidly controlled high heat inputs and rigid fixtures to maintain accurate alignment of parts.

WELDING INSTRUCTION

Instruction in Welding Metallurgy will be sponsored in the San Diego, Calif., area this fall by the U. of California's University Extension program. Frank G. Harkins, Solar Aircraft Company welding engineer and member of the Welding Research Council's Resistance Welding Committee, starts classes Thursday, September 14.

Harkins repeats a course which was enthusiastically received last year by weld technicians, welders and project engineers in the area. His instruction covers welding phenomena encountered in joining carbon steels, low alloy steels, stainless steels and the newly-developed super alloys, and urges a scientific approach to welding problems.

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THE WEST ON ITS WAY

ALASKA

$20,000,000 PULP MILL—is on the way, according to reports. Ketchikan Pulp and Paper Co., affiliate of Puget Sound Pulp and Timber Co., has contracted with the Forest Service to start construction of a mill of that capital outlay, about six miles north of Ketchikan. Agreement, dated August 2, 1950, is now extended one year while the company studies the problem of waste disposition in a pilot plant at Longview.

ALASKA LOOKS GOOD—to a Belgian firm, who has spent $200,000 in surveys and engineering toward establishing a pulp mill at Sitka, according to B. Frank Heintzelman, regional forester for Alaska. So far, however, the Belgian firm has been unable to raise the necessary investment capital.

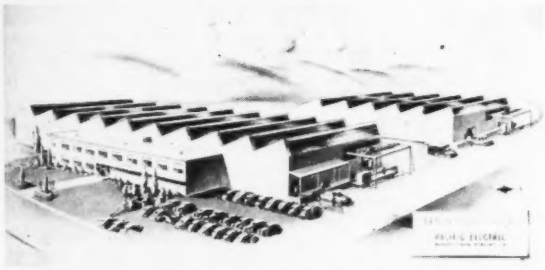
ARIZONA

MANGANESE DEPOSIT—"probably" the largest on the North American continent, according to U. S. Bureau of Mines, is located in the area of Artillery Peak in Mohave County. The Bureau is conducting large-scale efforts to open it: if it upholds expectations, it would make the U. S. self-sufficient in manganese.

$500,000 PHOENIX MILK PLANT—will be built, starting after Sept. 1, by Carnation Company. Site is a 20-acre tract at Central Ave. and Indian School road. Lescher and Mahoney, architects, designed this new milk and ice cream processing plant.

MILL AGREES TO SELL GENERATORS, BUY JUICE—Electric power generating units of Southwest Lumber Mills, Inc., one at Flagstaff (3,000 kw.) and one at McNary (7,400 kw.) have been bought for $1,250,000 by Central Arizona Light and Power Co. and Northern Arizona Light & Power Co., under an arrangement whereby the utilities companies agree to take waste material from the mills to operate the generators, and the mills will buy back power and steam for their manufacturing operations. Surplus power from the Flagstaff plant will be piped over Northern's system.

CALIFORNIA



Pacific Electric Manufacturing Corp. Santa Clara Plant

$500,000 SANTA CLARA PLANT—will be built for Pacific Electric Manufacturing Corp., by Bechtel Corp. on Brokaw Road. Initial production is scheduled for early in 1951. Architect's drawing, above, shows layout of the site. Plans call for two large, mill-type factory buildings, with attached two-story office facilities, on the 23-acre site. All employees, production tools and equipment will be moved to this new location from the now-leased building in San Jose.

PACKING PLANT PURCHASED—Tiedemann & Harris, San Francisco packers, have sold to Krey Packing Co., St. Louis, who will operate the California plant as a branch, and enlarge the canned meat production. William J. Bahey will be manager of the branch.

LUMBER CO. EXPANDS—Harold Casteel Lumber Co., Willits, purchases 12 acres of adjoining land, on which they plan to erect a planing mill, resaw and lumber dry kilns. New kilns are planned to hold 100,000 feet of lumber.

PLANING MILL FOR CRESCENT CITY—is expected to be in operation by next March. Contract has been signed by Fred Korthase, Goldendale, for its construction.

STAUFFER CHEMICAL ENLARGES RESEARCH DEPT.—at Richmond, by addition of a 32′ x 44′ wing to the present research laboratory. This new space will be used for research on synthesis and formulation of new agricultural chemicals, and for development work on the regular line of heavy industrial chemicals.

$500,000 IN MACARONI—processing plant for San Leandro being spent by Golden Grain Macaroni Co. at the foot of 139th Ave. Building will be a one-story masonry and steel frame structure with 42,000 square feet of floor space. Four large silos will hold 10 carloads of raw materials. Plant will have a capacity of a carload of macaroni products per day.

POWDER PLANT BURNS—with loss of about $200,000. Bermite Powder Co. plant near Saugus suffered destruction of three buildings and considerable damage from a fire started by a spark that dropped into a box of strontium nitrate.

Western Insulated Wire Co. Los Angeles Plant

INSULATED WIRE PLANT—The first 40,000 square foot unit of it, is completed and now in operation. Western Insulated Wire Co., manufacturers of insulated electric cords and cables, is now located at 2425 E. 30th St., Los Angeles 58, in the building shown above.

EASTERNER BUYS WESTERN OPERATION—National Supply Co., Springfield, Ohio, buys Atlas Imperial Diesel Engine Co.'s engine division, at Oakland. Purchase price not reported, but it includes Atlas name, patents, trade mark, engine-making machinery, and 13 engine sales and service units, with their inventories, in both the U. S. and Canada. Engine production machinery will be moved to the Ohio plant. Atlas will continue other operations at their Oakland plant.

WESTERNER BUYS EASTERN OPERATION—Turco Products, Inc., Los Angeles, buys Swan-Finch Oil Corp.'s Newark, N. J., plant, where dry cleaning and liquid cleaning materials will be manufactured in the 55,000 square foot plant. No report on purchase price.

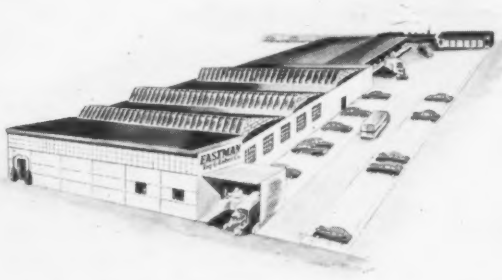
METAL FURNITURE PLANT—A Western operation for Marshallan Manufacturing Co., Cleveland, Ohio, manufacturer of metal promotional utility tables, cabinets, typewriter tables, has been established in a new 17,000 square foot plant at 311 West Avenue 33rd, L. A. Stamping as well as assembly is performed at this new location. Chrome dinettes will be added to the line later.

COLUMBIA STEEL EXPANSION—Additional cold reduced and tin plate facilities at Pittsburgh to provide annual capacity of 215,000 net tons of sheets and tin plate, to be completed late summer 1951. Present cold reduction sheet and tin plate mill at Pittsburg, placed in operation two years ago, will be enlarged considerably to house the new equipment, which will include a continuous pickler; a four-stand cold reduction mill for cold rolling steel up to 54 inches in width; an electrolytic cleaning line; an electrolytic tinning line; four additional coil annealing furnaces; a side trim and recoil line;

THE WEST ON ITS WAY

and a continuous sheet galvanizer. The latter is a recent development in the steel industry and will mark the first time such equipment has been installed in the West.

UPHOLSTERING PLANT—known as "Pacific Mode," operated by a partnership of brothers Tony and Quirino Furiani, opens at 1451 S. Toberman St., L. A., in a 7,200 square foot building. Specialty is manufacture of light-scale and budget-priced upholstery furniture.



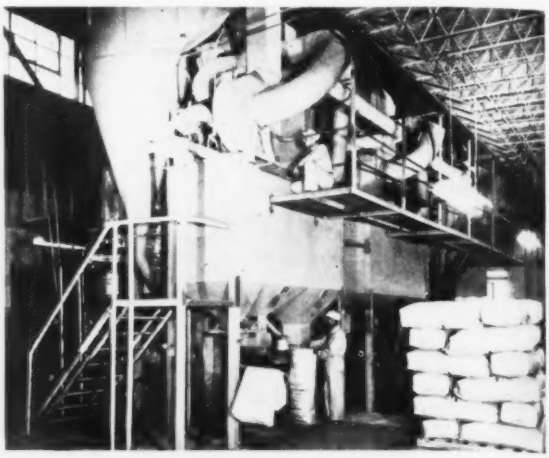
Eastman Tag and Label Co. Los Angeles Plant

TAGGED LARGEST WESTERN TAG AND LABEL PLANT—Eastman Tag & Label factory starts production at 720 E. 59th St., L. A., in a new 35,000 square foot plant, shown above.

DeVILBISS SELECT SANTA CLARA—for location of their new Western plant. The Toledo, Ohio, manufacturer of air compressors and paint spray equipment have leased 25,000 square feet of an eight-acre site in Santa Clara for an assembly and distribution plant. It will serve territories covered by branches in San Francisco, Los Angeles, and Salt Lake City.

WHARF CONSTRUCTION—is going on at Richmond, for the Santa Fe Railway. It will be a 550-foot covered unit, 50 feet wide. Two railroad tracks will run full length and connect by a spur to the Santa Fe main line. Wharf tracks will have a 22-car capacity. Construction is expected to be completed by Oct. 1.

RABBIT PACKERS BAND TOGETHER—in a new trade association known as "Rabbit Packers of California," with Richard Popick, president of El Monte Rabbit Company, elected president of the new organization.



California Zonolite Co. Los Angeles Operation

VERMICULITE PROCESSING PLANT OPENS—California Zonolite Company, exclusive processing distributor in California, Nevada and Arizona for the Zonolite Company, miner and processor of vermiculite, opens a new plant at 5440 San Fernando Road, west, Los Angeles, which will act as an addition to the plant in operation at Sacramento.

Eyes Right!

RIGHT LIGHTING

● The eyes have rigid requirements in efficient lighting. Smoot-Holman certified illumination meets those requirements with unvarying quality and performance created by superior engineering and skill. Beauty, high efficiency and dependable operation are the hallmarks of the finer lighting equipment that bears the Smoot-Holman label in institutional, commercial and industrial installations.

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SMOOT-HOLMAN
INGLEWOOD, CALIFORNIA
MADE IN U.S.A.

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HOW **to put the Indian sign on glove costs**

Put Sureseal PK Coated Work Gloves on the job and you'll save plenty of wampum. The tough, pliable Sureseal PK Coating is super-resistant to chemicals and abrasion, won't crack or peel—ever. Jumbo size, comfortable curved finger design. Made in all standard styles. Also available with Surety's Griptite Finish for extra wear, sure-fingered gripping action.

Ask your distributor or write direct.

SURESEAL PK COATED WORK GLOVES

Western Division
544 Market Street
San Francisco 4, California

THE SURETY RUBBER CO.

THE WEST ON ITS WAY

NEW TUNA PACKERS—are about to go into business. California Tuna Packing Corp., San Diego, expects to begin production of 350,000 cases annually, next March. $750,000 will be invested in plant and equipment. Buildings to be built on the site of Lynch Shipbuilding Co. Earl M. Nielsen will be president and general manager.

GOODRICH RUBBER EXPANDS—with construction of a new $300,000 addition to present warehouse facilities at their L. A. tire and tube manufacturing plant.

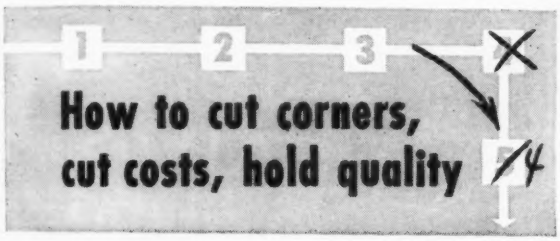
BATTERY PLANT BURNS—at Redlands, with damage set at $200,000. Gill Battery Co., Navy contract battery manufacturers, plans to rebuild as soon as possible.

RICHMOND PLANT CONSTRUCTION—is being undertaken for Rheem Manufacturing Co., as an addition to their present Richmond plant, to allow for production of 55-gallon lithographed steel drums.

P. G. 'n E. POWER PLANS—extend into 1952 and 1953. They have just ordered three new 100,000-kw. steam-electric generating units to be installed within three years. They will add 402,000 hp. to the system at a cost of about $50,000,000. These new generators will be installed in the Moss Landing or Contra Costa plants, or both.

CAST IRON PIPE PLANT—U. S. Pipe and Foundry Co., E. Burlington, New Jersey, starts construction of a $2,500,000 foundry at Decoto, to produce cast iron pipe for the Pacific Coast market. Plant is scheduled for completion by July 1, 1951, and initial employment is estimated at about 150 persons.

PAC LEASES AIRPORT—near Chino-Ontario, 35 miles southeast of L. A. Formerly operated under the name of Cal-Aero, this airport will now be known as Pacific Airmotive Airport. Master lease includes the mile-square airport and buildings and runways. PAC acquired this airport to augment their other bases for current and future needs in airplane and engine overhaul. The company announced also that they will institute an immediate hiring program in the immediate area.



How to cut corners, cut costs, hold quality

OAKITE metal-cleaning procedures can make an entire production operation easier, cheaper, quicker. Here are two examples:

1. Pre-Paint Treatment Saves $800 Monthly That's what an electrical manufacturer credits to the OAKITE Crys-Coat PROCESS, which simultaneously cleans and phosphates metal surfaces.

2. New Brass Cleaner Makes Big Savings A large electroplating job shop cleans brass with a new Oakite formula that minimizes tarnishing and rejects; cleans so well that, in many cases, a copper strike is dropped from the plating cycle.

FREE Write Oakite Products, Inc., 1001 E. First St., Los Angeles or 681 Market St., San Francisco, Calif., for the new 44-page booklet *"Some good things to know about Metal Cleaning"*. Subjects:

Machine cleaning	Tank cleaning	Electrocleaning
Pre-paint treatment	Pickling	Paint stripping
Steam-gun cleaning	Burnishing	Rust prevention

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OAKITE SPECIALIZED INDUSTRIAL CLEANING MATERIALS • METHODS • SERVICE

ACCURATE PIPE CUTS

Quick and Easy

"Anybody does better work with better tools—If they come any better than RIDGID I've never seen 'em."
RIDGID
No 2 HEAVY DUTY
1/8 TO 2
If this Housing ever Breaks or Distorts we will replace it Free

RIDGID Cutters roll right through all kinds of pipe and conduit

● It's really a cinch to cut pipe extra fast with the popular efficiency-balanced RIDGID cutter. Thin heat-treated tool-steel blade leaves practically no burr. Every cutter factory-tested to make sure it tracks perfectly. Your choice of five sizes to 6" pipe; four-wheel cutters to 4." Choose the favorite of men who know fine tools — buy RIDGID cutters at your Supply House.

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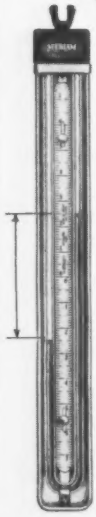
WORK-SAVER PIPE TOOLS

THE RIDGE TOOL CO. • ELYRIA, OHIO

MERIAM INSTRUMENTS FOR INDUSTRY

For 37 years we have been solving measurement problems by supplying standard or special instruments to accurately measure pressures, vacuums and flows of liquids and gases. We have constantly improved, developed and diversified the line so as to meet fully all needs of the field.



U-TYPE MANOMETERS

The Clean-Out Manometer (at left) for line pressures up to 100 lbs. per sq. in. A wing nut permits the Manometer body and tube to be disconnected from the head — the tube cleaned with a brush furnished or tube replaced, and the instrument reassembled without disconnecting the head section from the piping. Send for Bulletin No. 1.

The Model A-995 WM Manometer for line pressures up to 400 lbs. per sq. in. These instruments are built with heavy walled annealed straight Pyrex tubes, gland packed top and bottom in steel end blocks and clamped to the body at fixed intervals to prevent distortion. Catalog Sheet A-995 WM gives complete details.

WELL-TYPE MANOMETER

Model A-275 WM (at left) is a direct reading type for line pressures up to 150 lbs. per sq. in. Standard construction; ranges — from 6" to 24". Wall mounted type shown; also available in flush mounting. Ask for Catalog Sheet A-275 WM.

SIGHT FEED BUBBLER

This Sight Feed Bubbler with 2½" dia. bowl of Pyrex glass is good for line pressures up to 50 lbs. per sq. in.; of plastic, for pressures up to 100 lbs. Sturdily built with brass or semi-steel body. Supplied in ring type (shown) and strap type. Needle valve controls bubbler rate. Ask for Bulletin 21.

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ESTABLISHED 1911
MANOMETERS, METERS AND GAUGES FOR THE ACCURATE MEASUREMENT OF PRESSURES, VACUUMS AND FLOWS OF LIQUIDS AND GASES

THE WEST ON ITS WAY

COLORADO

SWEET DEAL FOR COLORADO SPRINGS—Nestle Co. Inc., manufacturers of food products, moves headquarters from New York City to Colorado Springs in a leased 100-room hotel, converted to temporary office space. They plan construction soon on a $1,000,000 building on a 16-acre tract.

ANOTHER DECENTRALIZATION AFOOT—is evidenced by Colorado Development Council's report that an arms plant, one of the nation's largest manufacturers of sporting arms, is interested in locating in Colorado, and moving from the East. They would like to find a one-story plant of from 50,000 to 75,000 square feet in area with good rail connections.

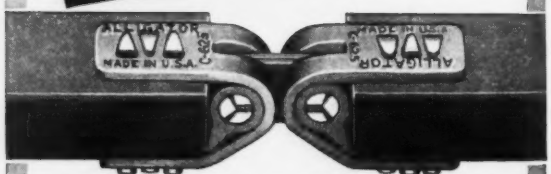
IDAHO

NEW LEWISTON MILL—is being planned by Pataha Valley Lumber Co., as part of their expansion program. Felix Rogers, Seattle engineer, is designing plans for the band mill unit. Estimated cost of the sawmill is between $100,000 and $150,000.

$10,000,000 AEC CONSTRUCTION PROJECT—The Fluor Corporation, L. A., is selected as contractor for construction of the materials testing reactor (MTR) at the Reactor Testing Station in the Twin Buttes area. The core is being constructed by the Oak Ridge National Laboratory, in consultation with Argonne National Laboratory. Operating in the thermal, or slow, neutron energy range, this reactor will give research workers a much-needed tool—a reactor in which to test materials under a neutron bombardment more intense than is produced in any other known reactor. The estimated cost for this reactor, not including research and development, is about $18,000,000 of which the cost-plus-fixed-fee construction contract with Fluor covers about $10,000,000.

Now you can fasten V-belts by using

ALLIGATOR
V-BELT FASTENERS



● Alligator V-belt Fasteners and the open-end V-belting now being made by belting manufacturers, will enable you to make up multiple V-belt drives from roll belting. These fasteners have been on the market 9 years and are now being used on a wide variety of drives.

Available for B, C, D sizes of belt for industrial use and 1-in. and 2-in. sizes for railroad use. These fasteners, however, should not be used for repairing endless cord V-belts.

Bulletin V-205 will give you complete details as to where and how these fasteners are used, sizes, list prices, tools and application instructions. A copy will be mailed at your request.

Order from your supply house

FLEXIBLE STEEL LACING COMPANY
4642 Lexington Street, Chicago 44, Illinois

Also sole manufacturers of Alligator Steel Belt Lacing for flat transmission belts and Flexco HD Belt Fasteners and Rip Plates for fastening and repairing conveyor belts.

THE WEST ON ITS WAY

MONTANA

PRIMARY ALUMINUM PRODUCTION—is expected to begin in a new plant to be constructed near Hungry Horse Dam, by Harvey Machine Co., Torrance, California. Harvey Co. is purchasing one line of rectifiers from the government's aluminum plant at Riverbank, California. These new owners are newcomers to the primary aluminum business. They plan to use power from Hungry Horse Dam in the Flathead River's South Fork to reduce partly refined bauxite clay to pure aluminum ingots, to be shipped to California for manufacturing. They have options on 700 acres in the Hungry Horse Dam area near Columbia Falls, at the foot of Teakettle Mountain, two miles northeast of Columbia Falls. First installation would be one pot line; the complete plant, as projected, would have three pot lines. Estimates have it that this aluminum plant will probably be located within 15 miles of the dam, and will have a 2,000-man payroll of about $100,000 weekly.

$5,000,000 PHOSPHORUS PLANT AT SILVER BOW—will be built by Victor Chemical Works, Chicago, according to reports. They and the Bonneville Power Administration have agreed on a 25-year contract to supply power for the operation, beginning in September, 1951. Victor will employ about 200 men to make elemental phosphorus from available deposits.

NEVADA

STRAWS IN THE WIND—otherwise around Nevada indicate that Combined Metals Reduction Co. has plans for new plant construction some time next year at Henderson. The new plant is expected to produce lead, manganese, and zinc from concentrates that will in turn be produced from a concentrator to be constructed at Pioche. National Lead Co. also intends to erect a plant near Henderson, where they expect to produce titanium and other metals. That project is reported to start late in 1951.

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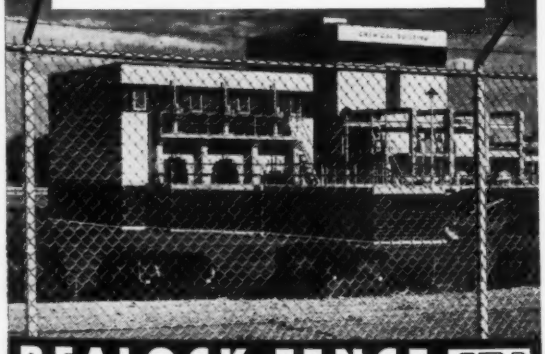
PROTECTION PLUS

- All fittings, hinges and locking devices have bolts *on the inside,* secure from tampering.
- Heavily galvanized by a special process, Realock Fence is weather-resistant, extra strong and durable...costs little or nothing for maintenance.

For complete details refer to Sweet's Catalog. For free estimate consult your classified telephone directory—or write direct.



REALOCK FENCE

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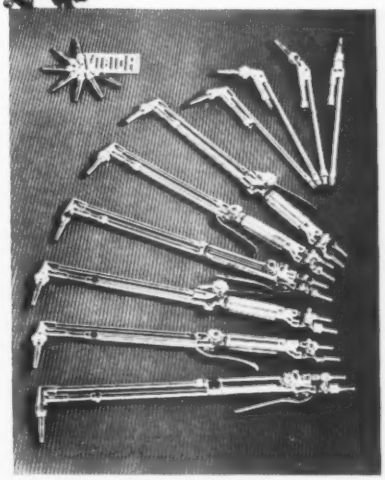
FOR WELDING

WELDING TORCHES TO CUTTING WORK

This VICTOR welding torch butt Model 310 and cutting attachment Model 2450 is one of many you can use for converting from welding to cutting. No wrench needed.

VICTOR attachments are made so you can change quickly from welding to cutting operations. You simply select the attachment, tip type, and tip size suited to your job and gas supply. Tips are available for oxy-acetylene, natural and city gas, and liquefied petroleum gas.



Here are other VICTOR hand cutting torches. As shown, these torches come with high-pressure valve lever in 4 different positions—top, bottom, front, or rear of torch handle — so operator may choose position best suited to him. Note, too, torch head can be purchased with 90°, 75°, 45°, or straight head. Head and tube assemblies are easily interchangeable.

ONE TORCH HANDLES MANY JOBS

A complete range of tips and sizes permits you to use your VICTOR welding torch for such varied field and shop jobs as plate, general and heavy cutting; cast iron, rivet and boiler tube cutting; scarfing, deseaming, descaling, and rivet piercing.

VICTOR also makes regulators for all gases; a full line of machine and hand torches, cylinder manifolds, cylinder trucks, emergency pack-type flame cutting outfits, and fluxes.

It costs less to own and operate VICTOR!

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Standard and Special Ball Thrust Bearings • Angular Contact Ball Bearings • Special Roller Bearings • Ball Retainers • Sleeves • Hardened and Ground Washers • Bushings

● A survey of your high precision parts requirements by Aetna engineers may bring you important economies. For, here at Aetna, besides top quality ball and roller bearings, you will find today's most advanced facilities for producing an infinite variety of miscellaneous precision parts . . . to whatever hardness or precision finish you need . . . at prices usually below your own production costs. Complete laboratory control and exceptionally strict inspection procedures will guard the quality of your parts from start to finish. Our variety of tools and dies are so extensive that most parts can be produced to fit your requirements without extra expense of special tooling . . . even should you require washer-type parts up to 38" O.D. Send your prints for recommendations and estimates. No obligation.

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THE WEST ON ITS WAY

OPEN PIT MINING OPERATION—is started at Kimberly, according to A. J. O'Connor, general manager of Consolidated Coppermines Corp. The Isbell Construction Co. has been engaged to strip and mine, by the open pit method, some 3,000,000 tons of ore adjacent to the Morris mine. Stripping operations will take about three years to complete.

OREGON

INLAND NAVIGATION GOES COASTAL—with their enlarged operation program, now including shipping to and from Crescent City, Calif. Construction of a dock for handling lumber is probably now underway. The company will also begin work on construction of a tank farm for storage and transfer of petroleum shipments which originate in the Los Angeles and San Francisco areas. Inland has purchased a derrick barge, now in San Pedro, and their plans call for putting two tugboats and two or three barges into service.

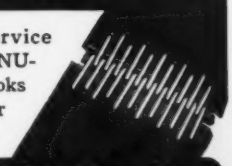
CANNERY WILL CAN AGAIN—F. G. Lamb Co. and the RFC have completed agreements whereby the Lamb Co. will take over the cannery at Weston and operate it. Price for the cannery is said to be in excess of $300,000. It will be put into operation in 1951, for both canning and freezing, and will be renamed Lamb-Weston. Officers of that new concern are: F. Gilbert Lamb, president; Sidney Reese, vice president; Reese Lamb, secretary-treasurer.

PLYWOOD FIRM HAS PLANS—for eventual construction on new property. Portland Manufacturing Co. has bought the northeast corner of S.W. Jefferson St. and 6th Ave., a 70 x 100 foot site, at a reported figure of about $80,000. No immediate plans for construction have been completed.

SAWMILL SOLD—The old "Boy Scout" sawmill on upper Klamath Lake, has been sold by M. L. Robinson, trustee for the bankrupt Wheeler Pine Co., to Ellingston Lumber Co., Klamath Falls for their bid price of $56,100, according to reports. This deal involves also about 125 acres of land.

for Better Belt Joints

To keep belts in service longer, use only GENUINE Clipper Belt Hooks applied with Clipper Belt Lacers.



use Clipper Belt Hooks

Clipper Hooks are made of the finest quality wire—BETTER than ever before—produced for our exclusive use. Hooks hold with firm, sure grip—give longer satisfactory service.

and Clipper Belt Lacers!

The Clipper No. 9 Portable Lacer laces belts up to 6 inches wide in one quick, easy operation. Under powerful pressure hook legs are embedded flush with the surface of the belt and points clinched, making a perfect joint. Phone your mill supply jobber for a demonstration!

CLIPPER BELT LACER COMPANY, GRAND RAPIDS 2, MICHIGAN, U.S.A.

THE WEST ON ITS WAY

LUMBER FIRM SOLD—Ralph L. Smith Lumber Co., Klamath Falls, has been sold to the newly-formed Klamath Door Co. President of the new firm is Andres Honzel, local manager of Kalpine Plywood Co.

MANUFACTURING PLANT SOLD—The remanufacturing plant of Western Timber Products Co., at Eugene, has been sold to Edward P. Anderson and S. E. Samuelson and associates. S. E. Samuelson is the new general manager.

UTAH

$300,000 WORTH OF POWER TRANSFORMERS—for AEC reactor testing station in Idaho will probably be supplied by Westinghouse Electric Corp., Salt Lake City, according to word received from the Idaho Falls office of AEC. That firm was apparent low bidder on the requirement.

COBALT REFINERY NEAR GARFIELD—Utah Construction Co. has been awarded a contract by Howe Sound Co. to erect a cobalt refinery near Garfield. Details on the deal as well as planned construction and dates of operation are not available at this writing.

ANOTHER GENEVA STEEL MILL—will be built by Geneva Steel Co., to produce 100,000 tons of hot rolled sheets per year. Operation is scheduled to start next summer, with about 50 persons employed.

WASHINGTON

NEW STANCAL REFINERY—opens at Point Wells, near Seattle, with a production capacity of 150,000 tons annually of asphalt paving materials.

NEW SAWMILL AT COLUMBIA FALLS—will be erected by T. L. Clark Lumber Co., to be electrically operated. Great Northern Railway have leased the Clark firm six lots for the purpose.

ELECTROLIFT *makes light work*

of materials-handling. One man merely presses a button to get this worm-drive electric hoist to lift loads — up to 6 tons — and move them to the desired location. ElectroLift operates quietly and with very little power. For complete information on models to meet your capacity, speed and plant layout needs, phone or write your nearby ElectroLift representative listed in the classified telephone directory. Or write to address below.

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"It's time we brightened up our store
With nice new carpets on the floor."

"A fine idea, right away!
Let's shop through Classified today!"

Whatever you need to modernize your store or office, turn first to the Yellow Pages of your Telephone Directory. For there you'll find rug and carpet dealers, upholsterers, painting contractors — almost everyone who sells or serves. When you're ready to buy, find it fast in the Yellow Pages. Just as other buyers will find your products fast, too, when you advertise in Classified.

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Pacific Telephone

Greater Safety with

GOODSEAL INDUSTRIAL GLOVES

SURE PROTECTION FOR BUSY HANDS. Goodall's safe, comfortable, puncture-resisting Goodseal Gloves are extra tough with greater resistance to acids, oils, chemicals, degreasing solutions, solvents, abrasion, etc. Goodall Goodseal Gloves last longer . . . serve every industrial need . . . and give workers added assurance when working in dangerous fluids. ORDER GOODSEAL *ALL-PURPOSE* RUBBER GLOVES TODAY OR WRITE FOR FOLDER.

APRONS FOOTWEAR	For full protection, order Goodall's finest quality rubber aprons and waterproof footwear.
OTHER GOODALL PRODUCTS	Waterproof Clothing • All Types Rubber Hose • Belting and Packing.

GOODALL RUBBER CO.
LOS ANGELES · SAN FRANCISCO
SEATTLE · DENVER · SALT LAKE CITY

THE WEST ON ITS WAY

$2,000,000 KAISER EXPANSION—includes addition of a seventh potline at the Mead reduction plant. This will increase the plant's production capacity by 15,000 tons of aluminum annually. Operations are scheduled to start next spring.

ANOTHER KAISER EXPANSION—is being undertaken at the Trentwood rolling mill, where production is expected to be increased by 25%. Remelt furnaces, idle since World War II, will be converted from coal to oil and put back into operation. And a production bottleneck will be eliminated with the installation of new machinery to increase sheet-splitting capacity 30%.

BOEING TOO—will spend in the neighborhood of $3,000,000 to step up its Seattle research and manufacturing facilities. Half of that amount will go into expansion of the company-owned wind tunnel. The rest of it will go for new machines and tools and additional office accommodations.

Keeping the Wheels of Industry Cool for 36 Years

Packed in 5-10-25-50-100 lb. containers

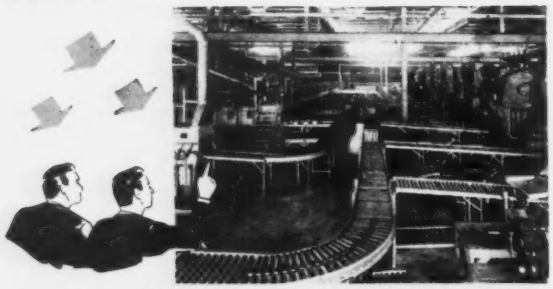
MOTOR MICA
TRADE MARK REG. U. S. PAT. OFF.

ANTI-FRICTION COMPOUND
★ Solves Toughest Lubricating Problems
★ Cools Hot Bearings
★ Reduces Friction Drag
★ Prolongs Life of Machines
★ A Little Goes a Long Way

Write for complete details and prices today. Ask for FREE Sample.

SCIENTIFIC LUBRICANTS CO. 3469 N. Clark St. CHICAGO 13, ILL.

What **should you expect of Conveying Equipment?**



● Conveyers and conveyer systems should be designed to meet specific problems. A purchaser has every right to expect that the conveying equipment he buys is the type that will best meet his requirements. He just can't afford trial and error methods. That's why more and more people are giving their conveying problems to Mathews Engineers, and are getting just what they should expect—a system of quality equipment, engineered to meet their specific requirements.

Whether the loads are heavy or light—whether you need two sections or a complete system of equipment—your Mathews Engineer is eager to help you to get just what you need and to give you the service you should expect.

Field Engineers or Sales Agencies are located in principal American and Canadian cities.

MATHEWS CONVEYERS
GENERAL OFFICES
Mathews Conveyer Company . . Ellwood City, Pennsylvania
PACIFIC COAST DIVISION
Mathews Conveyer Company West Coast . San Carlos, California
CANADIAN DIVISION
Mathews Conveyer Company, Ltd. . . . Port Hope, Ontario

GAS SERVES WESTERN INDUSTRY BEST

Can advanced methods of Controlled Heat reduce costs in your plant? Your Gas Company's Industrial Engineering Consultant is equipped to help you find out. Telephone your gas company.

PACIFIC COAST GAS ASSOCIATION

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First Class Permit No. 3755, Sec. 34.9, P.L.&R., San Francisco, Calif.

WESTERN INDUSTRY

609 Mission Street,

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Information Bureau, WESTERN INDUSTRY

Please send me information or bulletins mentioned under the following key numbers:

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Also further information on the following products advertised in this issue:

_____

_____

Name _____ **Title** _____

Company _____

Address _____

City _____ **Zone** _____ **State** _____

NEW MATERIALS & EQUIPMENT

FOR YOUR CONVENIENCE . . .

Use this postage-paid card to obtain further information on products mentioned on these two pages and literature listed on following page.

E-9507

Combination Work Table and Quench Tank for High Frequency Converters

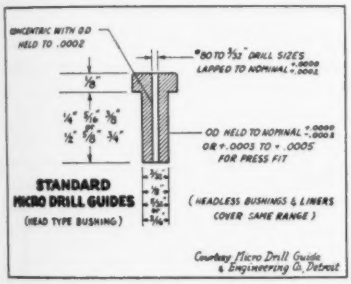
Features claimed: New combination work table and quench tank that can be easily attached to the vacuum tube or spark converters made by the same firm. With sink cover on, this unit forms a handy work table 29"x 56". Center portion of table-top may be removed, uncovering a brass (or stainless) quench tank 24"x 24"x 18" deep. Heating and quenching cycles are controlled by a 3-circuit timer operated by pushbutton or footswitch.

Manufacturer: Lepel High Frequency Laboratories, Inc., New York City.

E-9508

Standardized Micro-Drill Jig Bushings and Liners

Featured claimed: Commercially available for the first time is a complete standard line of bushings for micro drills of from #80 (.0135 in.)


CONCENTRIC WITH OD HELD TO .0002
#80 TO 3/32" DRILL SIZES LAPPED TO NOMINAL +.0000 -.0002
1/8"
1/4" 5/16" 3/8"
1/2" 7/16" 3/4"
OD HELD TO NOMINAL +.0000 -.0002 OR +.0003 TO +.0005 FOR PRESS FIT
STANDARD MICRO DRILL GUIDES
(HEAD TYPE BUSHING)
1/8"
(HEADLESS BUSHINGS & LINERS COVER SAME RANGE)
Courtesy Micro Drill Guide & Engineering Co. Detroit

to #42 (3/32 in.) and in four standard body sizes (3/32, 1/8, 5/32,and 3/16 in.). Liners for all body sizes are also included in the line. In this bushing line the drill bearing extends the full length of the bushing, giving better drill support, longer life, and greater accuracy in drilling. Use of specially developed deep hardening tungsten-type steel further increases bushing life and maintenance of accuracy. Bushing bores are chamfered to protect drills.

Manufacturer: Micro Drill Guide and Engineering Co., Detroit.

E-9509

Silicon Rubber Compound

Features claimed: This substance remains flexible at extremely low temperatures, and has an excellent resistance to abrasion. Its mathematical product of tensile strength times elongation has been increased by a factor of 2 to 6, and tear resistance is at least 3 times that of the best values measured on earlier silicon stocks. Manufacturer is prepared to fabricate a wide variety of parts, including gaskets, washers, sleeves, extruded sections, tubing, and a wide range of molded parts.

Manufacturer: The Stalwart Rubber Co., Bedford, Ohio.

E-95010

Portable Electric Hoist

Features claimed: Will hoist, lower, stop and hold weights up to 2,000 pounds. Operates on its own shop dolly, or any desired position on a truck bed. Can be maneuvered from one mount to another by one person. The operator, using push-button control, is free to move about for load guidance. Powered by a specially-designed 6-volt reversible motor.

Manufacturer: Lift-All Equipment Co., 400 N.E. 97th, Portland, Oregon.

E-95011

Full-strength Screw with Electrical Insulation

Features claimed: Insulating screw consists of a serrated metal core which has been extrusion-coated with a thermoplastic material, giving it the advantages of electrical insulation,

shock resistance, and vibration damping. Four of these screws can, therefore, replace 18 parts formerly used.

Manufacturer: Forman Insulating Screw Corp., New York.

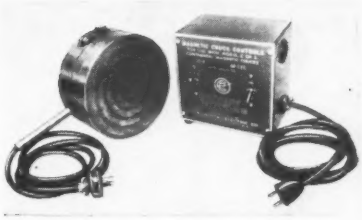
E-95012

Air-Powered Machine Vise

Features claimed: A powerful milling machine vise operating without levers, cams or pins. Taking almost any size work, this Vi-Speed machine vise offers a longer stroke (up to 4 in.) for faster, smoother manipulation. Its regulator gives constant pressure; it is speedy, safe, and fully adjustable.

Manufacturer: Van Products Company, Erie, Pa.

E-95013



Magnetic Holding Power for Lathes

Features claimed: Electric magnetic chuck, Model C, can hold lathe work to the surface of the chuck by magnetic force with a total pull of over two tons. It can be used as a magnetic chuck, a de-magnetizer, or a magnetic inspection tool, to inspect small parts for cracks and fractures that are not ordinarily visible. Ideal for use in die work, it can be used for setups requiring heavy cuts on lathe work. $125.00.

Manufacturer: Continental Electric Co., Hawthorne, Calif.

E-95014

Non-ferrous Metals Clad with Silver Brazing Alloy

Features claimed: This development, known as Braze-clad, consists of laminating a layer of silver brazing alloy to one or both sides of such metals as copper, most types of brass, all types of nickel silver, jewelers' bronze, beryllium copper, cupronickel, nickel, monel, etc. Braze-cladding eliminates the necessity of using rings, washers, pre-formed special shapes, and other forms of silver brazing alloy currently used in metal joining. Since the entire joint surface of the parent metal is pre-diffused with silver brazing alloy, voids caused by dry spots and oxide islands are eliminated.

Manufacturer: Rolled Plate Division, American Silver Co., Flushing, N. Y.

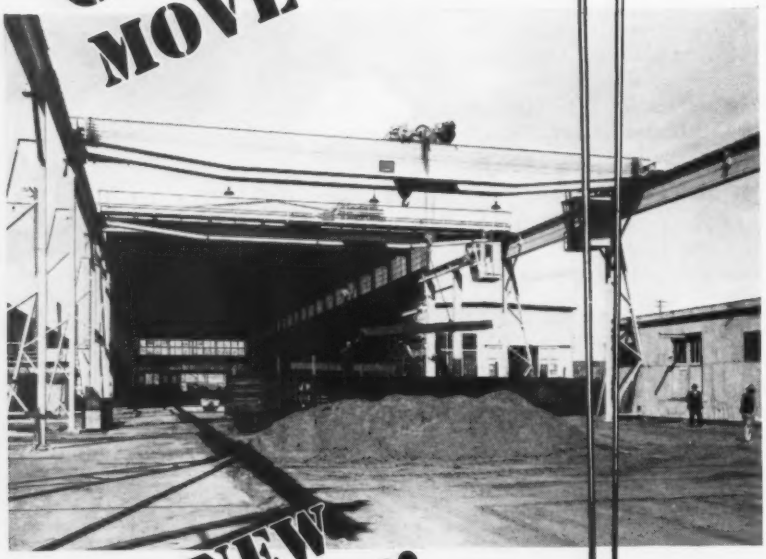
E-95015

Quick-drying Glue

Features claimed: Wilhold White Glue joins wood in 30 min. Will make an invisible joint. When diluted with water it makes an excellent prime and protective invisible coat to keep unfinished fixtures or furniture from soiling.

Manufacturer: Acorn Adhesives and Supply Co , Los Angeles, Calif.

EDERER CRANES MOVE MATERIALS AT NEW "CARCO" PLANT



Six hundred feet of craneway in the new steel fabricating plant of Pacific Car & Foundry Company, Seattle, carries two new 15-ton EDERER overhead cranes—streamlining and facilitating materials handling on large steel jobs. As in so many Western industries, the cranes were custom-built by EDERER to exact job requirements. Similar custom-building may be just the answer to your materials handling requirements.

JUST TEAR THIS OUT . . . Attach it to your letterhead, sign and mail to us for Bulletin C-308.

155C50

EDERER
ENGINEERING COMPANY
2931 FIRST AVE. SO. SEATTLE 4, WASH.

All-Electric Overhead Cranes • Grapple Cranes • Monorail Hoists • Hand-Operated Cranes

E-95016

Steel Thinner Than Hair

Features claimed: A steel alloy with special magnetic properties, so thin it takes ten layers to equal the thickness of a human hair, was brought out with the development of high-frequency electronic equipment. By successive passes through a special mill, this alloy is reduced in thickness to .00025 (twenty-five hundred-thousandths) of an inch.

Manufacturer: Armco Steel Corp., Middletown, Ohio.

E-95017

Long-running Spring Motor

Features claimed: Spring motors designed around the Neg'ator, a new type of elastic member made from prestressed flat spring stock, are characterized by two attributes: (1) a constant output torque, and (2) a long running time (large numbers of turns) on a single winding. The unusual feature of the Neg'ator which permits the design of such spring motors is its ability to exert constant, or even decreasing, force with increasing deflection.

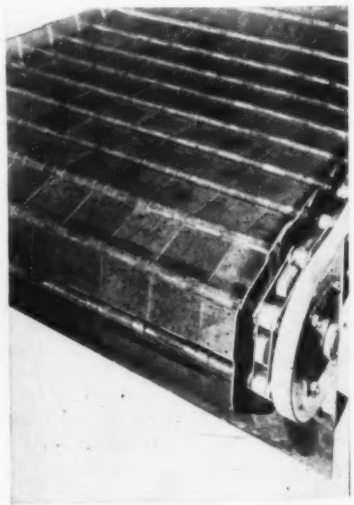
Manufacturer: Hunter Spring Co., Lansdale, Pa.

E-95018

Hinged-steel Conveyor

Features claimed: A heavy-duty conveyor belting developed to facilitate mechanized handling of hot heavy forgings, stampings, chips, and flash, as well as wet or dry metal scrap. Belting can be assembled into almost any required length or width from stocked component parts. Special link and rod design, in conjunction with the side wings, eliminates fall-through of materials handled.

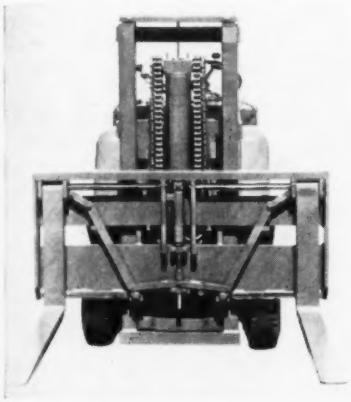
Manufacturer: May-Fran Engineering, Inc., Cleveland.



E-95019

Variable Adjustment for Fork Lift

Features claimed: Hydraulically adjustable forks enable the operator of a fork lift truck to vary the distances between the two forks at any time by means of a conveniently located control lever. By permitting the operator



to regulate the distance between the forks without leaving his seat, and while the truck is in motion, this development will make it possible for one lift to handle pallets or materials of different widths.

Manufacturer: Towmotor Corp., Cleveland, Ohio.

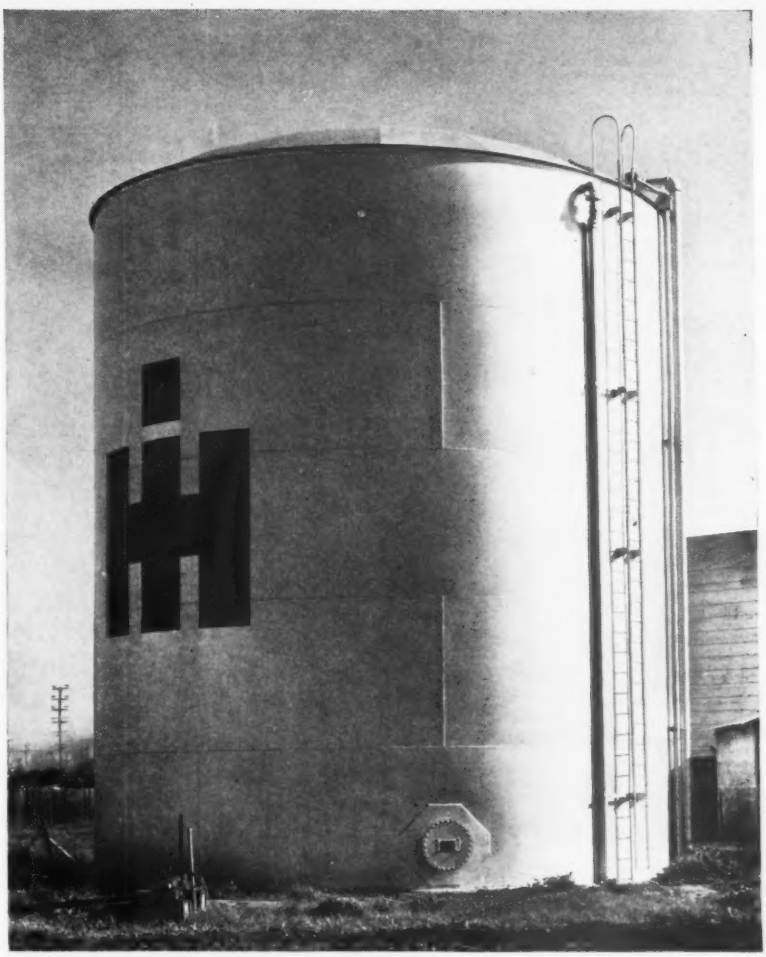
E-95020

Light Concentrator

Features claimed: A device providing an abundant source of illumination for close work wherever eyestrain is apt to occur. This unit can be attached to any frosted light bulb from 40 to 100 watts. Spot of illumination is approximately 4 in. in diameter, and 12 in. from the bulb. Brightness of the working area is improved by more

than five times. It incorporates a fresnel type of plastic lens which can be quickly clipped on and off the bulb with an attached spring wire clip.

Manufacturer: Clarkstan Corp., Los Angeles, Calif.



Should Fire Strike...

This 200,000 gallon Horton welded steel suction tank is located at the International Harvester Company plant in Stockton, California. Should the pressure in the city water mains become too low to adequately supply the company's sprinkler system, the water stored in this reservoir will be pumped into the sprinkler lines automatically. All this means dependable fire protection for International Harvester . . . and it can mean the same for you.

Horton fire protection tanks are used extensively by industries throughout the nation. In adition to the flat-bottom type tank shown above, we build elevated tanks to provide gravity water pressure for either the primary or secondary supply. These tanks may also be piped for dual service, so they can be used to furnish water for both fire protection and general service. Horton elevated tanks are available in capacities from 5,000 to 3,000,000 gallons. Flat-bottom welded steel tanks like the one shown above can be furnished in capacities up to 10,000,000 gallons. When you need either a flat-bottom or an elevated storage tank, write our nearest office for quotations.

CHICAGO BRIDGE & IRON COMPANY

Atlanta 3.....2144 Healey Building
Birmingham 1.....1560 North 50th Street
Boston 10.....1065—201 Devonshire Street
Chicago 4.....2132 McCormick Building
Cleveland 15.....2256 Guildhall Building
Detroit 26.....1567 Lafayette Building
Houston 2.....2164 National Standard Building
Los Angeles 14.....1570 General Petroleum Building
New York 6.....3334—165 Broadway Building
Philadelphia 3.....1666—1700 Walnut Street Building
Salt Lake City 4.....568 West 17th South Street
San Francisco 4.....1578—200 Bush Street
Seattle 1.....1369 Henry Building
Tulsa 3.....1667 Hunt Building

Plants in: BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA.

Compact Power! Rugged Strength! Tremendous Leverage!

Snap-on*

twenty-one piece • 1" Square Drive

Extra Heavy Duty Socket Set

LOXOCKET CONSTRUCTION

A positive-acting button-lock makes any combination of units as safe as a one-piece wrench. Easy release allows you to interchange sockets swiftly and easily.

THESE tools give you the extra power and leverage to break loose big rusted-on nuts and bolts, or to pull them up to the tightest degree. It is a husky set that speeds the heaviest nut-turning work with great safety because of the famous Loxocket design.

No. 521-EHD-B Set includes 17 Hexagon Loxockets from 1-7/16" to 3-1/8". The handle equipment consists of a Ratchet Head, Sliding Bar and two Extension Bars, 8" and 16" long.

*T M Reg U S Pat Off

SNAP-ON TOOLS CORPORATION

8032-I 26TH AVENUE
KENOSHA, WISCONSIN

E-95021

Tempered Dial Glass for Hydroscales

Features claimed: An impact-resistant dial glass that eliminates the need for protective metal guards on the face of a Hydroscale, a hydraulic crane scale. The glass is up to five times as strong as plate glass of equal thickness yet will bend as much as 20° without breaking. It will also absorb a thermal shock of 500° without breaking or distorting. It can be polished indefinitely without scratching.

Manufacturer: Hydroway Scale, Incorporated, Detroit.

E-95022

Resinoid-type Wheels

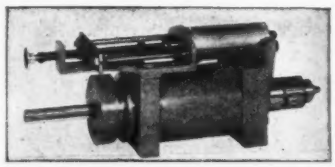
Features claimed: Resitred tread material includes all the features of the aluminum alloy Aerol wheels plus increased rollability, quietness, and greater load capacity. It is resistant to all common fats, acids, and greases, and is practically indestructible. Resitred is spark-proof, and, being semi-hard, permits heavier loads to be moved with less effort. Materials used in the construction prevent rust, corrosion, and deterioration.

Manufacturer: Aerol Co., Inc., Burbank, Calif.

E-95023

Speedy Drilling and Tapping Unit

Features claimed: The HyPneuMat, which utilizes either hydraulic or pneumatic power and permits speeds up to 20,000 r.p.m., has a drilling and tapping capacity of ⅜ in. in steel, and a ⅛-in. to 3½-in. stroke. Its features, in



addition to automatic cycling, include infinite adjustable feed, adjustable stroke for both directions, variable spindle speed, uniform smooth power, ease of installation, automatic hand or foot control, dwell action adjustable from 0 to 120 seconds, and chip cleaning action.

Manufacturer: HyPneuMat Inc., Milwoukee, Wis.

E-95024

Swedish Vernier Calipers

Features claimed: These imported calipers give positive accuracy to .001 in. for outside, inside, depth, and thread measurements from 0 to 6 in. Precision ground measuring surfaces

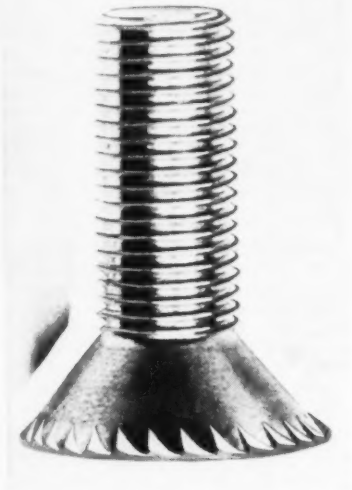
are glass-hardened and lapped. Graduations are extremely fine and easy to read. The precision-fit sliding head allows absolutely no play. Known as the Baltic, the caliper has an extra heavy 1/8-in. x 5/8-in. ground bar of top quality Swedish steel. $17.25 list.

Address: Transocean Trading Co., 1511 N. Gardner, Los Angeles 46.

E-95025

Washer-less Screw

Features claimed: The Spin-Lock Screw has patented ratchet-like teeth on the underside of the head, which are said to eliminate the time-wasting step of adding a washer. Because there



is just one piece to stock and buy, its use cuts inventory and purchasing costs. Locking power is positive, as there are no parts to cant or fall off. Fastening is neater (flush with surface) and safer (no protrusions to catch fingers or clothes). Available in hex, pan, truss, or flat heads.

Manufacturer: Russell, Burdsall & Ward Bolt and Nut Co., New York.

E-95026

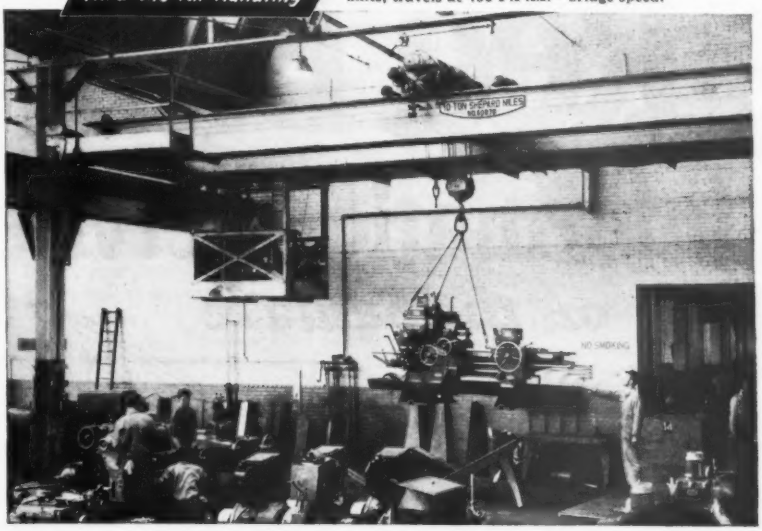
Non-electric Magnets

Features claimed: Alnico Perma-Plate magnets, available in three magnetic field ranges, are designed for removing miscellaneous tramp iron from wet or dry materials in process, in order to protect machinery or prevent sparks, as well as to purify non-magnetic substances. The variation of the field strength between the three types is employed to allow selection of that magnet which best suits a particular tramp iron removal job. Perma-Plate magnets are not affected by weather or high temperatures, will handle liquids or solids.

Manufacturer: Dings Magnetic Separator Co., Milwaukee, Wis.

For Lowest Cost Per Load-Use Dependable Thru-the-Air Handling

For this installation, operating conditions called for rapid travel over a large area. Controlled by operator in the cab, this Shepard Niles 10-ton, welded-beam crane, with main and auxiliary hoist units, travels at 450 F.P.M. —bridge speed.



we start by asking "what"

WHAT are *your* problems? Under WHAT conditions will *your* crane be operated—intermittently, or under fairly constant conditions? WHAT are the operating speeds necessary to meet *your* productive cycle?

Your answer to these and similar questions will enable us to engineer your installation so that it will give you the best, and longest service—at the lowest cost per load over the years.

Be sure you get the crane best qualified to do *your* job. It's wise—and costs you nothing—to get the facts first, rather than to make expensive changes later.

May we place our experience of a great many years of successfully designing all types of crane installations at your disposal?

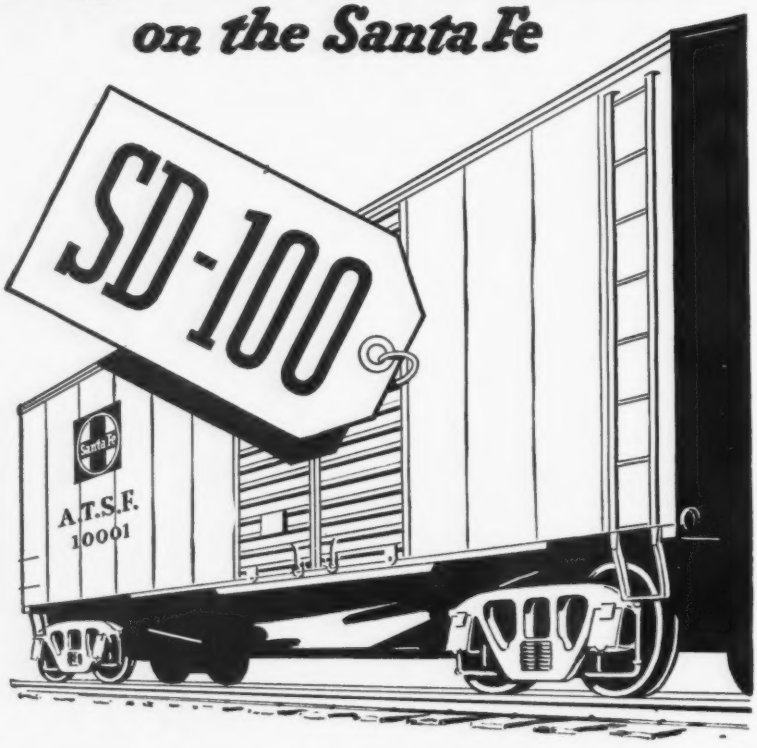
Shepard Niles

CRANE & HOIST CORPORATION

Makes and sells all three lifting tools for airborne shop loads

SHEPARD NILES CRANE & HOIST CORP., 469 Schuyler Avenue, Montour Falls, N. Y.
INDUSTRIAL CONSTRUCTION CORP. LTD., 826 Santa Fe Avenue, Los Angeles 21, Calif.
STRYCO MFG. CO., 470 Natoma St., San Francisco 3, Calif. • MR. PRESTON FALLER, 1921 Minor Ave., Seattle 1, Wash.

"Red Ball"
Information Service
on the Santa Fe



This tag illustrates how cars are identified; SD is for San Diego, 100 is the checking number only this car will have while on the Santa Fe.

Where's that car of freight?
When do I get it?

Santa Fe answers these two questions with its RED BALL INFORMATION SERVICE which tells shipper or consignee where his carload is at regular intervals when shipped over our line . . . *and tells him fast.*

Through the facilities of Santa Fe's vast private communication system extending to all Santa Fe traffic offices, information regarding your Red Ball freight is promptly placed on your desk. This information will directly benefit you in planning production or sales promotions.

Let us send you our folder describing this service. Just call or write your nearest Santa Fe Traffic Office. *It pays to "Ship Santa Fe All The Way"!*

F. H. Rockwell, *General Freight Traffic Mgr.*
Santa Fe System Lines, Chicago 4, Illinois

Santa Fe—all the way

Santa Fe

HELPFUL LITERATURE
for the plant operator who wants to keep informed

9501-L

PLASTIC COATING MATERIALS AND METHODS—In a technical bulletin just issued. *Bee Chemical Company, 13799 South Avenue "O," Chicago 33, Illinois,* reports the latest developments in its continuing field and laboratory work with plastic coating materials and methods. Several new types or varieties of LOGOQUANT are now available to meet requirements and conditions of various kinds, and the bulletin describes these applications. Copies may be had without charge.

9502-L

"SPEED NUT SAVING STORIES"—Case histories describing significant cost reductions provided by Tinnerman SPEED NUT products has been published in an attractive two-color booklet. This publication contains 14 reprints of advertisements reporting how large firms have realized tremendous savings in assembly costs by using Tinnerman SPEED NUTS, SPEED CLIPS or SPEED CLAMPS. Address: *Tinnerman Products Inc., Cleveland, Ohio,* for your free copy.

9503-L

FIRE FIGHTING TECHNIQUES — Data and recommended Fire Fighting techniques from the development of "Pyrodyne" by *Aquadyne Corporation, 220 East 42nd Street, New York 17, N. Y.,* are summarized in a new booklet titled "Abundant Wet Water for Fire Fighting," 12 pages, 7" x 10". Copies are available on request.

9504-L

"PRELIMINARY WOOD PRESERVATION STATISTICS" for 1949 are available and may be procured from the *U. S. Forest Service, Washington 25, D. C.* This statistical series, parts of which go back to 1909, is issued in cooperation with the American Wood-Preservers' Association. The figures for 1949 are based on reports from 270 plants representing more than 95 per cent of the wood treating capacity in the United States. A final and more detailed report will be released later in the year.

9505-L

ADVANCED HYDRAULIC LIFT TRUCKS—In Bulletin 5031, just released, engineering sketches present in detail the advanced features of the new Barrett MD Hydraulic Lift Truck, which has been developed to permit the easier and more economical handling by one man of loads up to two tons and more. The MD hydraulic lift truck has a load capacity of 5,000 lbs. with 6-inch lift. Its pallet model, the MX, has a capacity of 4,000 lbs. with a 4-inch lift. The bulletin contains complete specifications on both types. Larger capacities are available in special units. Mail your request for Bulletin 5031 to *Barrett-Cravens Co., 4609 S. Western Blvd., Chicago 9, Illinois.*

9506-L

DYNA-LIFT—*Hydraulic Products Company, P. O. Box 487, Providence 1, Rhode Island,* have made available a 10-page booklet illustrating and describing models, installations and uses of the air-operated Dyna-Lift for general utility purposes in shop and plant, including repairing of radiator cores, gas meters and other bulky objects, as a welding positioner, as a packaging and cleaning unit, and for other uses. Your free copy is available upon request.

READING GUIDE FOR WESTERN MANAGEMENT

A service for all management levels . . . current literature surveyed and appraised by the faculty of the School of Management, Golden Gate College

Communicating Ideas to the Public

By Stephen E. Fitzgerald, Funk & Wagnalls Company, New York, 1950, $3.50.

"Steve" Fitzgerald, to this reviewer's personal knowledge one of the more thoughtful men in the public relations field, has in his new book made at least a preliminary sally into a never-never land heretofore explored chiefly by pedants.

"We know how to prepare information," Fitzgerald says, "but we have very little idea as to how to get that information inside the brain cells of other people." Educators will note this as all too true, as will also business executives and professionals in public opinion work who have tried to get (say) economic data across to employees and others.

Whatever the causes, lack of understanding, often based on plain lack of information, gives rise to major problems between individuals, between groups, and even between nations. This volume sets as its purpose "to examine problems of human communications from a special point of view: how people get information, especially information on which they base action and opinion."

Fitzgerald then proceeds to outline the remarkable transition from the "public be served" philosophy now espoused by all truly progressive organizations. He points out that a company enjoys public favor when it deserves and achieves the support and understanding of people with which it is able to communicate.

The author covers much ground that is familiar to qualified public relations practitioners but he has fresh thoughts to offer on such aspects as the characteristics and best uses of various communications media, how to tell a public relations counsellor from a press agent, the "grassroots" approach in community relations, how to blueprint a public relations program, putting public opinion polls to work, etc.

Some excellent material, offered here in layman's language for the first time, is presented on various experiments that have been made in the techniques of communicating ideas, and with media for transmitting such ideas. An example is the experiment made with Harvard and Radcliffe students who were given the names of 16 authors and asked to rank them in order of preference. Later they were given 16 passages of prose, each ascribed to one of the authors, and were asked to rank these. The students ranked the prose just about as they had ranked the authors—but it later was revealed that *all* of the prose passages were written by only one of the authors—Robert Louis Stevenson. (To discover what this proved, if anything, you'll have to read the book!)

In any event, *Communicating Ideas to the Public* is well worth the time of anyone who is in any way involved in trying to get information into the noggins of ordinary people. And who in business, education or public life today is not?

Reviewed by:
BROOKS DARLINGTON
Lecturer in Public Relations

Briefer Guides From The Management Library

Management's Role in Economic and Technological Development

American Management Association, New York, General Management Series No. 146, 1950.

Includes: The challenge of research and technology to management. Developments in management organization for efficient production. Economic development and the business manager. Added management responsibilities in the era ahead.

What Every Corporation Director Should Know

By Percival E. Jackson. William-Frederick Press, New York, 1949, $3.50.

With the growing complexity of business, the effectiveness of directorship control is a problem of increasing seriousness to stockholders, executives, and directors. In this handbook for the corporate executive, the author specifically indicates the extent to which board of directors can provide management assistance to operating executives. Special attention is given to the qualifications of such directors and the inducements offered to attract competent men.

The Development of Executive Leadership

Edited by Marvin Bower. Harvard University Press, Cambridge, Mass., 1949, $2.50.

Here, in terms of the experience and thinking of five top-management executives and an outstanding economist, are the principles, problems, suggestions, and illustrations on the general theme of what it takes to be a business leader and how to go about advancing in business. The contributors are: Sumner H. Slichter, L. R. Boulware, William B. Given, Jr., Joseph B. Hall, George S. Dively, and Thomas G. Spates.

Supervision in Business and Industry

By R. D. Loken and Earl P. Strong. Funk & Wagnalls, New York, 1949, $3.50.

This book covers step by step the duties of the line and staff supervisor in organizing, planning, and controlling production. A practical training program is presented, based on the best ideas, methods and procedures developed by foremen and supervisors from all types of business and industry.

Graphic Presentation Simplified

By R. R. Lutz. Funk & Wagnalls, New York, 1949, $4.00.

A practical guide to the use of graphic methods in business, this book shows how to present facts in their most simple visual form. Detailed information is given on: curve charts, bar charts, circle charts, sector charts, dot maps, pin and tack maps, flow maps, and the use of color.

Corporate Legal Departments

National Industrial Conference Board, New York, Studies in Business Policy, No. 39, 1950.

Today it is almost impossible for companies to operate without legal guidance. This report outlines the organization and operation of the corporate legal department, based on a survey of fifty-two departments. A detailed description of six of these departments is also included.

Protecting the Package In Transit

American Management Association, New York, Packaging Series No. 34, 1950.

Includes: Loss reduction through modern techniques of carloading and bracing. Advanced package practices for shipment by truck. Practical developments in packaging for export.

New Uses For Plastics In Packaging

American Management Association, New York, Packaging Series No. 35, 1950.

Includes: Use of polyethylene as a paper coating. New uses of hydrocarbon plastics for packaging. Protective packaging with molten thermoplastics. Evaluating the relative cost of packaging materials and methods.

Reviewed by:
BERNA M. CARLSON
College Librarian

WESTERNERS AT WORK

California

MONESMITH

BURT C. MONESMITH, formerly works manager, becomes manager of manufacturing for *Lockheed Aircraft Co.* when HERBERT E. RYKER, vice-president in charge of manufacturing, resigns to become advisor and special assistant to the vice-presidents and the general manager of Hughes Aircraft Co. Monesmith was one-time manager of Lockheed's Tulsa plant.

Resin Industries, Santa Barbara, appoints ROBERT J. GRASLEY, chemical engineer known in the East for his work in the field of plastics, as head of the company's technical staff.

J. GRAYSON JONES elected vice-president of *Conrac, Inc.*, television receiving set manufacturers. He was formerly chief engineer of the company.

ROBERT A. HORNBY, vice-president of *Pacific Lighting Corp.* since 1937, named executive vice-president, succeeding LEROY M. EDWARDS, who was retired August 1.

LOUIS C. BALL named assistant to the general manager of *Kaiser Gypsum*, a division of Kaiser Industries, Inc. He was formerly geologist and administrative assistant to the general sales manager of the company.

KARL A. PANITZ joins *National Motor Bearing Co., Inc.*, in Redwood City as chief engineer. He was formerly vice-president in charge of production for the Arthur Colton Co., Detroit.

Arrowhead Rubber Co. division of National Motor Bearing Co., Inc., appoints M. R. BELL to post of factory manager of its new plant now in operation at Downey near Los Angeles, manufacturing "O" rings, seals, molded mechanicals, extruded rubber parts, and silicone rubber items.

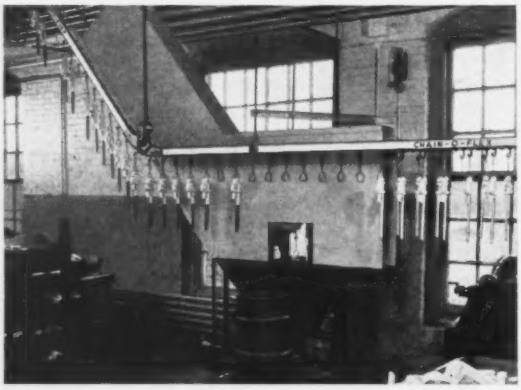
McCulloch Motors, Los Angeles, appoints as personnel manager LEWIS S. PECK, who formerly held the same position at Lane Wells Co. and Emsco Derrick & Equipment Co.

Hammond Lumber Co. announces the following appointments: EARL B. BIRMINGHAM, who has been vice-president in charge of the redwood division mills at Eureka and Samoa, is now executive vice-president at San Francisco. WALDRON HYATT, formerly in charge of logging operations in the redwood division, now resident manager at Samoa; GRAY EVANS, who has been assistant logging superintendent, named superintendent of Big Lagoon logging operations, Big Lagoon Camp, Humboldt County.

BIRMINGHAM

PAUL R. HARTIG named manager of *General Electric Co.*'s Oakland plant at 5441 E. 14th St. Hartig will have full responsibility for manufacturing, engineering, sales and labor relations at the plant. He was formerly assistant superintendent of the company's Holyoke, Mass., factory.

CHAIN-O-FLEX CONVEYOR



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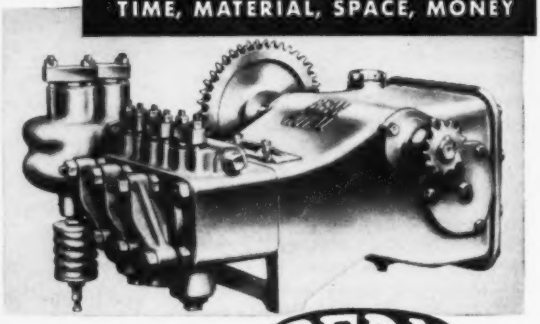

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FESSENDEN

F. J. FESSENDEN is named manager of the assembly plant of *Chevrolet Motor Division* at Van Nuys. He succeeds L. C. FITZGERALD, transferred to be manager of the assembly plant in Baltimore.

TROTTER

Cannon Electric Development Co. appoints these two new plant executives at its Los Angeles factory: RAY O. HILL, comptroller; and JOHN K. TROTTER, production manager.

RICHARD B. BEHRMAN succeeds JOHN M. MILLER as factory manager for *U. S. Rubber Co.* in Los Angeles; Miller has been named assistant general manager of the tire division with headquarters in New York.

Colorado

C. C. TAPPERO, former assistant superintendent of industrial engineering at the Pueblo steel works of *Colorado Fuel & Iron*

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Co., becomes superintendent of the newly-created combustion department at the steel works. GILBERT D. BROOKS, for 32 years a member of the production team, appointed assistant superintendent of the combustion department. FRANK F. ARGUST becomes assistant superintendent of industrial engineering at Pueblo. VICTOR W. JOHNSON, a C. F. & I. employee for 44 years, now in full charge of the company's $5,000,000 Morgan rod mill at Pueblo.

Golden Cycle Corp., Colorado Springs, names HAROLD S. WORCESTER director and assistant general manager. He is also vice-president of Colorado Mining Assn., and a member of Colorado State Metal Mining Fund Board. MAX W. BOWEN takes the place of A. H. BEBEE, deceased vice-president and general manager; C. H. CARLTON becomes mining manager; and JOHN JACOBS, JR., becomes comptroller.

Idaho

ROBERT R. WEIDEMAN, formerly assistant manager, becomes mine manager for *Silver Dollar Mining Co.* at Wallace. He succeeds ERNEST C. GNAEDINGER, retired.

Oregon

STEPHEN R. ANDRUS named to the staff of the Service Bureau of the *American Wood Preservers' Assn.* western office at Portland. The service bureau was established by the wood preserving industry to make available technical advisory service by trained engineers to county engineers, consulting engineers, and the construction industry in the West.

JOHN J. O'FARRELL becomes management engineer in charge of the methods engineering, inventory control and I.B.M. departments of *Hyster Co.*, 2902 N.E. Clackamas St., Portland, manufacturers of auxiliary tractor tools and materials handling trucks.

Utah

BLACK

LAWRENCE F. BLACK, Cleveland, Ohio, joins *Geneva Steel Co.* as general superintendent of the Geneva plant. He was formerly assistant chief engineer of American Steel & Wire Co., Cleveland, like the Utah company a subsidiary of United States Steel Corp.

Washington

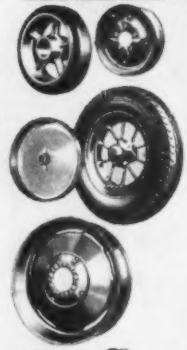
Officers of the new corporation of *Georgia-Pacific Plywood & Lumber Co.*, which recently acquired the assets of Acme Door Co., Hoquiam, are: S. R. BLACK, president; HERMAN SNIDER, general manager and executive vice-president; W. E. EVENSON, JR., secretary; and M. A. BERGER, controller.

R. H. BAILEY of Willapoint Oyster Co., Seattle, is president of the new *Northwest Food Manufacturers Assn.*, formed to promote home packed items.

Northern Pacific Railway names CALEB CORSER as assistant general manager of its Seattle office, succeeding the late J. T. STOLTER. Corser was formerly superintendent of the Lake Superior division.

Kenworth Motor Truck Co., Seattle, appoints DONALD E. DOUGLAS as treasurer and KENNETH T. WORTHINGTON, secretary.

ELECTRIC WHEELS



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Western TRADE WINDS

News about those who distribute and sell industrial equipment and materials

Arro Expansion Bolt Co., Marion, O., manufacturers of anchoring devices, expansion shields, toggle bolts, star or stone drills, bull points, and turnbuckles, appoints Howard Burt & Sons, 615 Second St., San Francisco, as its sales representative in the San Francisco area.

Arthur K. Meyer Co., 1206 South Maple Ave., Los Angeles 15, telephone RIchmond 7-9658, is now Los Angeles County sales representative for *Fine Organics, Inc.*, New York. The company recently announced its intention to enter the industrial and motor fleet market.

The Eugene, Oregon, branch of *Electric Steel Foundry*, handlers of contractors' equipment, logging rigging, and sawmill parts, is now located at 1464 West Sixth St., Eugene. In addition to ESCO the branch represents J. W. Minder Chain and Gear Co., Dodge Manufacturing Co., American Chain and Cable Co., U. S. Electrical Motors, Union Roller Chain Co., Moline Malleable Iron Co., Armco Steel Corp., Carpenter Steel Co., Tri-Clover Machine Co., and Ohio Gear Co. The Eugene operation serves the area from Salem south to Dunsmuir, Calif. L. F. Maxwell is branch manager.

Allegheny Ludlum Steel Corp., Pittsburgh, Pa., appoints Guy M. Winton as sales manager of its San Francisco district office. Winton replaces I. R. Leheny who has been appointed assistant manager of cutting tool sales for the company.

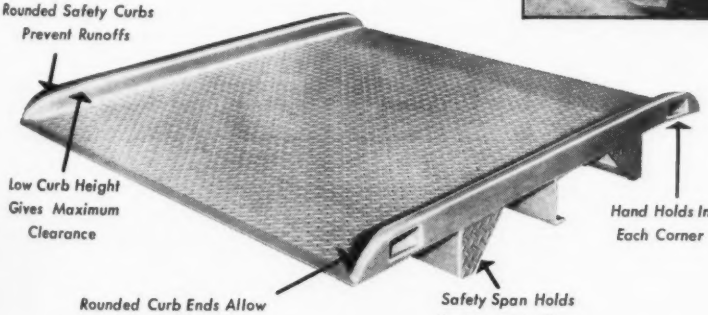
A. J. Phelan, formerly vice-president and chief engineer of *Turbodyne Corp.*, a subsidiary of *Northrop Aircraft Inc.*, Hawthorne, Calif., elected president, general manager and chief engineer, succeeding Thomas H. Quayle.

Yarnell-Waring Company, Philadelphia, Pa., names Lytton C. Musselman manager of its Los Angeles district office.

The Liberty Equipment & Supply Company, 2022 E. Seventh St., Los Angeles 21, California, announces its appointment as exclusive West coast jobber for *Marshall Steel Co.*, McCook, Illinois, manufacturer of ground flat stock tool steel in water, oil and air-hardening types.

MAGCOA *Magnesium* DOCKBOARDS

...will solve your carloading problems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Hagan Corp., combustion and chemical engineering firm of Pittsburgh, and its subsidiaries—*Calgon, Inc.*, *Hall Laboratories, Inc.*, and the *Buromin Co.*—are represented in a new Los Angeles district office at 3931 Tweedy Blvd., South Gate, telephone LOraine 6-6158. The office also will represent *Bull & Roberts*, which is associated with Hagan Corp. and subsidiaries in the marine engineering field.

Aircraft Industries Assn.'s Public Relations Advisory Committee, Western region, elects AL CLINE, director of public relations for Northrop Aircraft Co., Inc., as chairman, and LELAND R. TAYLOR, assistant to the president of North American Aviation, as vice-chairman.

SCHULER

EDWARD A. SCHULER, recently promoted from general sales manager for chemicals and plastics, San Francisco, to general sales manager of *Monsanto Chemical Company's* Western division, will in his new work have charge of sales for the area of Monsanto's complete line, including general plastics and chemicals, organic phosphates, rubber and the plywood glue, casein glue and urea manufactured in the Western Division's plant at Seattle.

JOHN R. GILLINGHAM is named director of client public relations and sales promotion for *James R. Lunke & Associates*, Oakland advertising agency, according to J. R. Lunke. The firm has moved to larger quarters at the Golden West Graphic Arts Center, 1549 Alice St., Oakland. Gillingham previously was associated with Westinghouse Electric Corp. in its public relations division.

DAVID R. MESLANG is the newly-appointed manager of the Seattle branch of *Crucible Steel Co. of America.*

Fentron Steel Works of Seattle appoints JOHN L. HAMILTON as general sales manager. Hamilton was formerly assistant sales manager in charge of marketing and advertising.

The Lamson Corp. moves from its present location at 611 Howard St., San Francisco, to 555 Bryant St., according to J. E. REGAN, Pacific Coast Manager. The new location offers more than 12,000 sq. ft. of floor space on one floor.

JOHN HESLIN, sales manager for *Unistrut Products Co.*, was a recent West Coast visitor. He headquartered at the offices of Squires & Marshall in San Francisco and Glenmart Co., Alhambra, while in Los Angeles.

HAROLD A. KITTLESON, Los Angeles electronic sales engineer, will represent *Blaco Mfg. Co.*, Cleveland, in four Western states. Blaco manufactures TV-FM installation accessories including grounding clamps.

General Plant Protection Co., 6900 South Hoover St., Los Angeles 44, adds to its building a technical annex devoted to experimentation with devices designed to increase property protection further. A classroom-auditorium is fully equipped for instruction in fire prevention and control of industrial hazards.

H. V. BORUP returns from a 3-month leave of absence to his work with the *Glen L. Codman Co., Inc.*, Oakland, Calif., distributors of Clark Equipment Co. fork-lift trucks, industrial tractors, and other materials handling lines.

Kennametal Inc., Latrobe, Pa., announces the appointment of CONRAD SEIM as service engineer working out of its Los Angeles office.

HANSEN

RAY C. HANSEN, JR., is now sales engineer of *National Tank and Pipe Co.*, a division of *M and M Wood Working Co.*, serving the Northwest states from the company office at 2301 N. Columbia Blvd., Portland. National Tank and Pipe Co. furnishes wood tanks and pipe products to the pulp and paper industry and to chemical, mining, and food processing companies.

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Gamble-Hawkins Company
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Portland, Ore.

Murry Jacobs Company
Phone: Eliot 2655
Seattle, Wash.

George M. Prescott Company
Los Angeles, Calif.
Phone: Adams 3-3247
Portable Conveyors

Roll-Rite Corp.
Phone: Glencourt 1-5921
Oakland, Calif.

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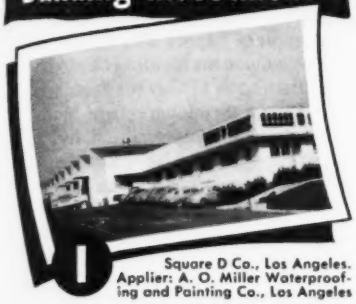

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You can seal cracks, stop moisture seepage, prevent the need for costly reconstruction by applying a thick, tough but elastic coating of Dum Dum Masonoc. This time-proved product weather-protects, insulates and improves the appearance of every building to which it is applied.

INSULATES—applied 1/16" to 1/8" thick, provides extra insulation and protection.

PLIABLE—Expands and contracts with ordinary movement of building surface.

BRIDGES CRACKS—Eliminates the chief source of destructive surface deterioration.

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2 DUM DUM FOR METAL—Its heavy film protects exposed metal surfaces against weather, fumes and gases. Stops rust and corrosion.

3 STACK DUM DUM—Heavy coating, protects concrete stack surfaces against vibration, high temperatures and general weather wear.

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Allis-Chalmers names as sales representatives to its West Coast offices the following men: EDWARD E. WILSON and RONALD D. BROWN to the company's Portland district office; DAVID H. HOLMES, Seattle; and JAMES V. MILLER, Spokane.

RAYMOND A. STERNTHALL becomes branch manager of the Los Angeles office and warehouse of *Chase Brass & Copper Co.*, succeeding the late T. FRANKLIN DAY, manager at Los Angeles for 16 years.

SKF Industries, Inc., establishes an 11-state sales region with headquarters at San Francisco. J. C. BOWMAN, district manager at San Francisco since 1936, has been appointed regional manager. The new region will include territory now serviced by district offices in San Francisco, Los Angeles, Portland, and Denver. This comprises the states of Washington, Oregon, California, Idaho, Utah, Wyoming, Montana, Colorado, Arizona, New Mexico, western Nebraska, and El Paso, Texas. The new office will expedite future requirements of Western industries for ball and roller bearings.

The Spokane branch of the *Electric Steel Foundry Co.* of Portland, Ore., moves to a new office and warehouse building at N. 1327 Washington St. N. J. VANELLI will serve as active head of the sales district, succeeding E. V. WICKEY. ESCO's new warehouse offers ample space for stocks of logging and construction equipment, stainless steel sheets, and pipe fittings.

HOLABIRD

National Electric Products Corp., Pittsburgh, Pa., names R. GRAHAM HOLABIRD as manager of its Western region office at 400 Potrero St., San Francisco. N. L. BOST is now manager of the Northwest district with headquarters in Seattle. R. E. STONE, Los Angeles manager of sales since 1931, is appointed manager of the Southwest district; and WILLIAM D. ROSS is now San Francisco district manager.

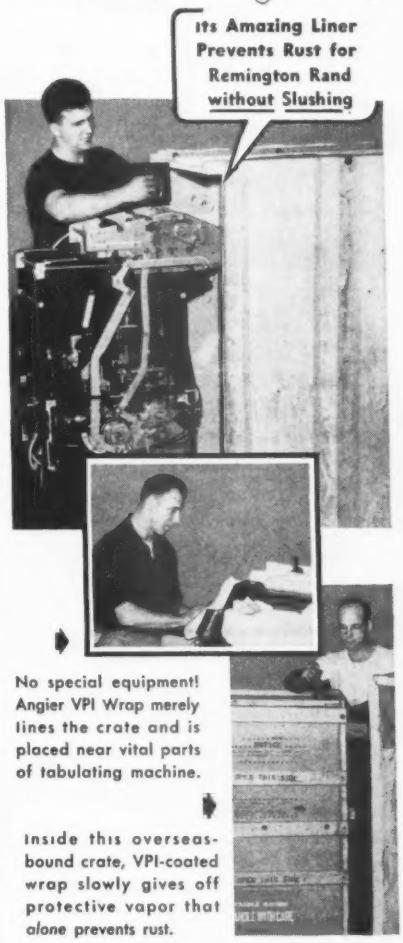
Ziegler Steel Service Co., sheet and strip specialists, 7022 Telegraph Road, Los Angeles 22, announces a new line of products enabling it to offer a broader steel service to most metalworking firms and to those companies using such products for maintenance service.

CHARLES STOECKLY of the *General Electric Co.'s* apparatus department in San Francisco is now manager of sales for the company's San Jose Motor Divisions. Mr. Stoeckly replaces DEAN FOWLER who will become manager of sales for G.E.'s Control Division in Schenectady, N. Y.

Acme Steel Co. announces the new location for its San Francisco office, now at 750 Second St., telephone GArfield 1-7582, with HERBERT F. MIDDLETON in charge. Acme Steel line includes flat steel strapping, tools, equipment, Silverstitchers, stitching wire, special products.

Nickel Cadmium Battery Corp. names GORDON H. PROFFITT, with offices in the Matson Building, 215 Market St., San Francisco 5, as its sales representative, serving all markets for Nicad Storage Batteries including railway diesel locomotive starting, marine, utility and highway truck, and bus services.

You, too, can *Cut Packaging Costs* with Angier VPI* Wrap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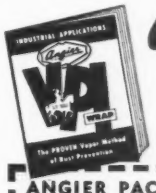

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Masonite Corp., Chicago, announces the following appointments: GEORGE M. SYVERSEN, director of Western sales; C. H. SMITH, manager of building sales; and JACKSON EDWARDS, manager of industrial sales in the Western division.

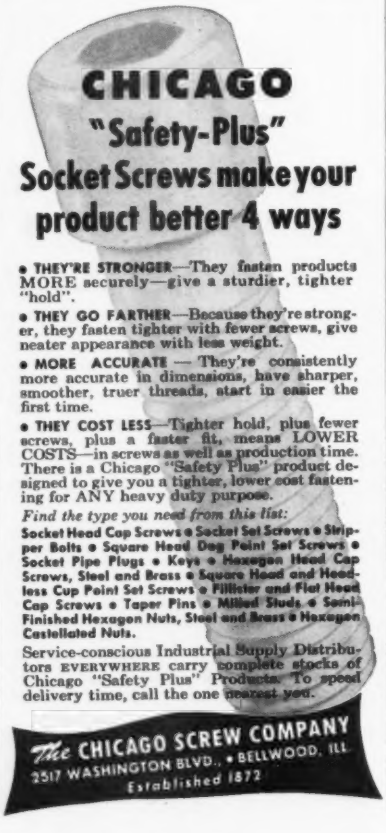
A. D. FRANKLIN becomes sales manager for *Weyerhaeuser Timber Co.*, Tacoma, Wash., succeeding R. S. DOUGLAS, recently appointed vice-president and general manager. Franklin was formerly manager of the company's central division at St. Paul, Minn.

DALY

The National Radiator Co., Johnstown, Pa., is opening a Pacific branch sales office at 681 Market St., San Francisco, with ROBERT E. DALY as branch manager. The office will be responsible for the sale of the company's boilers, radiators, convectors, baseboard radiation, and heating accessories in California, Oregon, Washington, Nevada, Idaho, and Utah.

Stephen Batori & Co., engineers-consultants, moves to a larger office at 605 Arctic Building, Seattle 4, Wash., telephone Eliot 6043.

Republic Rubber Division of Lee Rubber & Tire Corp. appoints THE WETZEL EQUIPMENT AGENCY, 375 South West Temple, Salt Lake City, Utah, as an accredited distributor, carrying a representative stock of industrial rubber products.



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Accidents Just Keep Happening

LAST YEAR in the northern California area alone, there was a total of 49 injuries involving jitneys, lift trucks, and flat bed trucks in use on and around the docks, according to information provided by the Pacific Maritime Association's Accident Prevention Bureau.

Nearly 40% of the 49 had to do with personnel who were struck. Although more careful selection and training of drivers would eliminate the basic cause, perhaps brighter paint on the vehicles plus less congestion and improved traffic control would help reduce that percentage.

Next most frequent type of accident was that of being struck by the knob on the steering wheel (16.3% of the 49). A smooth working surface would no doubt prevent such accidents to a degree, as would the driver's observance of holes and obstacles.

Associations Elect

Pacific American Steamship Association: JOHN E. CUSHING, president of Oceanic Steamship Company, elected president to succeed ALBERT W. GATOV, who becomes a member of the Federal Maritime Board. Cushing will continue in his capacity with Oceanic while assuming presidency of the Association. ROBERT E. MAYER, who has headed the jointly-operated public relations department of P.A.S.A. and Pacific Maritime Association, named assistant to the president.

Society of Industrial Engineers: President, Edwin L. Slagle, Jr., works industrial engineer, Columbia Steel Co., Pittsburg; vice-president, Arthur Casad, Gantner & Mattern Co., San Francisco; secretary, Angus Crocker, American Radiator-Standard Sanitary, Richmond; treasurer, Reno Col, Friden Calculating Machine Co., San Leandro.

SLAGLE

Northern California Chapter of the American Foundrymen's Society: President and chapter chairman, JOHN R. RUSSO, Russo Foundry Equipment Co., Oakland; vice-president and program chairman, PHILIP C. RODGER, General Metals Corp., Oakland; secretary, DAVIS TAYLOR, American Wheelabrator and Equipment Co., San Francisco; treasurer, FRED A. MAINZER, Pacific Brass Foundry Co., San Francisco.

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